ELECTRICAL WORLD

A McGRAW-HILL PUBLICATION

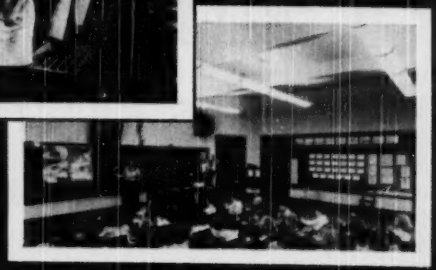
JUL 31, 1950 OAK PARK TRAC

Selling Planned Lighting

IN STORES

IN OFFICES

IN FACTORIES



IN SCHOOLS

Give me those WIDE OPEN SPACES

"DON'T CRAMP MY STYLE WITH KNUCKLE SCRAPERS . . . GIVE ME Murray BOXES . . . THEY'VE GOT PLENTY OF WORKING SPACE"
MORE THAN 6 INCHES LONG AND WIDE!

These Murray meter connection boxes are suitable for both indoor and outdoor use. Plenty of room for quick, economical wiring. Why put up with knuckle scrapers that cost you money in lengthy installation time?

Got a lot of wires to bend? Here's room to bend and more! Installation is quick, sure, economical. How many meters will your company install in the next year? 1,000—10,000—To see how much you can save with Murray boxes, just multiply your figure by the ten minutes or more your installer can save on each installation.

Murray® MANUFACTURING CORPORATION
1250 ATLANTIC AVENUE • BROOKLYN 16, N. Y.

SERVICE ENTRANCE & METER EQUIPMENT • MAGNETIC CIRCUIT BREAKERS
SWITCHES • CURRENT LIMITING REACTORS • CROWS'NEST AERIAL LADDERS

WRITE FOR BULLETIN 501B

OF PERSONAL INTEREST

So far as we know, there are only two aerial cable secondary networks in the country. One is in Waco, Texas, which **Electrical World** described July 2, 1949. The other is in Chattanooga.

Like most cities, Chattanooga has its full-fledged underground network in its downtown central shopping area. Also like most cities, this central area is fringed by "marginal" territory—where business is growing so fast it's out-growing the overhead system.

George Parker, Chattanooga Electric Power's chief engineer, pondered the situation. His problem: the fringe area was not yet ready for full-fledged underground.

So he put up an aerial cable network, planned for easiest conversion to underground when the time comes.

How it was done—including such technical stickers as best placement of transformers, etc—is told expertly in **Electrical World** for Aug. 14.

It's a story of what might be called a "transitional network"—a system that fills the twilight zone between overhead distribution and full-fledged underground ac secondary network.

Mr. Parker not only gives you the technical story, but explains the philosophy underlying this aerial cable secondary network.

•

What are the economics of the gas turbine? Between what brackets should utility operation lie, in order even to consider installation? Since the gas turbine has become technically practical, the economics of its use have emerged as $64 questions.

Definitive answers are supplied by A. G. Mellor, of G. E.'s Central Station Engineering Division, also in E. W. for Aug. 14.

•

In coming issues, **Electrical World** will discuss two more highly interesting facets of gas turbine activity:

1. Why not use both steam and gas, each for the bracket in which it offers superiority?

2. Perhaps the gas turbine can eventually become a peaking unit. Maybe its off-peak air can be stored for later use. Big problem here, of course, is devising a container for a day's need of huge volumes of combustion air for the gas turbine.

Anyway, it'll be interesting to look back, ten years hence, and see how these ideas worked out.

THE EDITORS

ELECTRICAL WORLD

Published for 76 years for those engaged in the business of generating, transmitting, distributing or applying electric power

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ELECTRICAL WORLD, Published weekly by McGraw-Hill Publishing Company, Inc. Publication Office, 99-129 North Broadway, Albany 1, N. Y. Editorial and Executive Offices, 330 West 42nd St., New York 18, N. Y. James H McGraw (1860-1948), Founder; Curtis W McGraw, President; Willard Chevalier, Executive Vice President; Joseph A Gerardi, Vice President and Treasurer; John J Cooke, Secretary; Paul Montgomery, Senior Vice President, Publications Division; Ralph B Smith, Editorial Director, Nelson Bond, Vice President and Director of Advertising; J E Blackburn, Jr, Vice President and Director of Circulation. Subscription rates: Single copy 35 cents. In the United States, $6 a year, $9 for two years, $12 for three years. Canada, $7 for one year, $11 for two years, $14 for three years. (Canadian money, at par.) Pan-American countries, $15 for one year, $25 for two years, $30 for three years. All other countries $20 for one year, $30 for two years, $40 for three years. Entered as second-class matter, November 16, 1936, at the Post Office at Albany, N. Y., under the Act of March 3, 1879. Printed in U. S. A.

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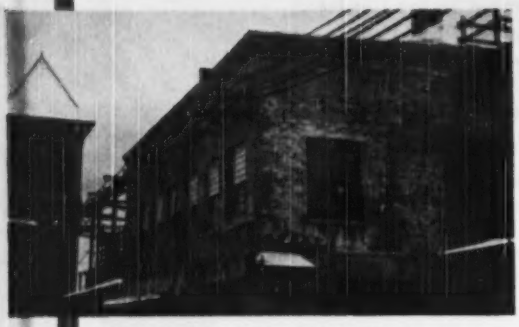
PLANT POWER-PROBLEM:

Costly outages caused by phase-to-phase flashovers and burndowns in open wiring strung in chemical atmosphere

SOLUTION:

OKOLITE-OKOPRENE

SELF-SUPPORTING AERIAL CABLE



COMPACT AND ECONOMICAL—Self-evident space economy combines with reasonable installation and low maintenance costs. 3/C #4/0 Okolite-Okoprene Self-Supporting Cables supply lighting for the various buildings.

DURABLE AND DEPENDABLE—Permanently weather-proof with no ring-cutting or lead sheath troubles. Long-lived, trouble-free circuits assured. 3/C, 500,000 CM Okolite-Okoprene 5 Kv Cables distribute power from sub-station to sulfite mill, beater room and screen room.

Dust, moisture and acid fog prevalent in the atmosphere surrounding the Rumford, Maine, mill of the Oxford Paper Company posed a problem in power circuit maintenance. The combination of these elements made it practically impossible to keep even the over-voltage insulators and wooden structures from becoming conducting to the point where even 2,300 volts resulted in phase-to-phase flashovers and burndowns. Moreover, burndowns of upper circuits would often cause loss of lower circuits through repeated burnouts as top wires dropped to underlying layers.

Solution of this serious problem was found in the substitution of Okolite-Okoprene Self-Supporting Aerial Cable for open wires. According to company officials, the combination of Okolite high voltage moisture and heat resisting insulation protected by non-conducting weather and chemical resistant Okoprene sheathing has eliminated this trouble.

With greatly reduced service interruptions and outages, Oxford engineers anticipate substantial reductions in maintenance costs. Other industrial users have had similar experiences and point out that this type of Okonite-engineered cable also gives improved circuit regulation because of lower reactance. In addition to its ***dependability***, they value it for ***compactness***—to eliminate congestion, reduce clearance problems, afford a modern, streamlined appearance—and for ***economy***...to save on installation as well as maintenance costs.

For outdoor or indoor installations, the industrial applications of Okolite-Okoprene Self-Supporting Aerial Cables offer convincing advantages. These are fully described in a 52-page manual available to electrical engineers and company executives. For your copy, send a request on your letterhead to The Okonite Company, Passaic, N. J.

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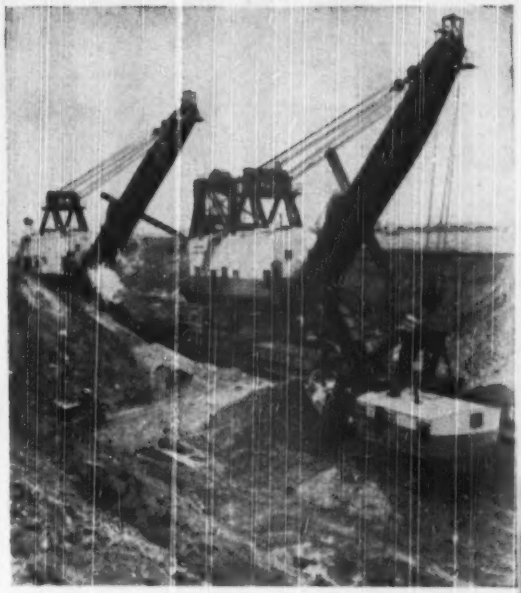

...If You Look To Input First!

Without a steady input of power, even the best electric machines, tools, and appliances fall short of top performance. And without portable cords and cables that will stand up under every operating condition you can't get steady input.

To meet the need for long, trouble-free service on all operations, Simplex-TIREX Cords and Cables are carefully designed with an eye to flexibility, electrical stability, and safe operation, and to assure toughness are jacketed exclusively with Selenium Neoprene Armor. Here's a compound that has proved itself under the most severe conditions of mining, construction, shipbuilding, and shop work to be unexcelled for balanced resistance to oils, grease, acids, moisture, flame and sunlight. It is CURED-IN-LEAD to gain extra toughness and assures effective resistance to abrasion, crushing, and twisting. When your portable apparatus is TIREX-equipped, Selenium Neoprene Armor provides security against untimely breakdowns and low output.

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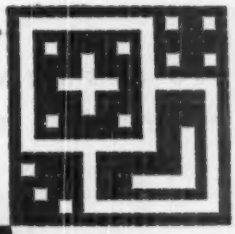

TYPE OF LAMP	NO. LAMPS 1	2	3	4	5
2 20W	★	★	★	★	
4 40W	★	★	★	★	
5 85W	★	★			
5 T-17 LB*	★	★			
4 425 ma.	★	★	★	★	
6 425 ma.	★	★	★	★	
8 425 ma.	★	★	★	★	

*Rapid Start Lamps

in the lightmeter:

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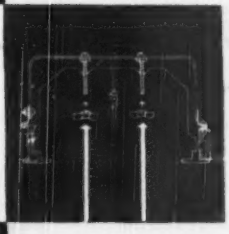

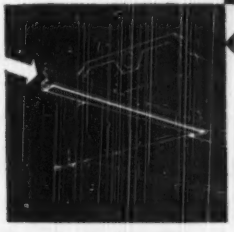

in the stockroom:

LITE-BLOX give the wholesaler a *basic "packaged" unit* that is quickly convertible from flange to teebar or vice versa.

Since 1902

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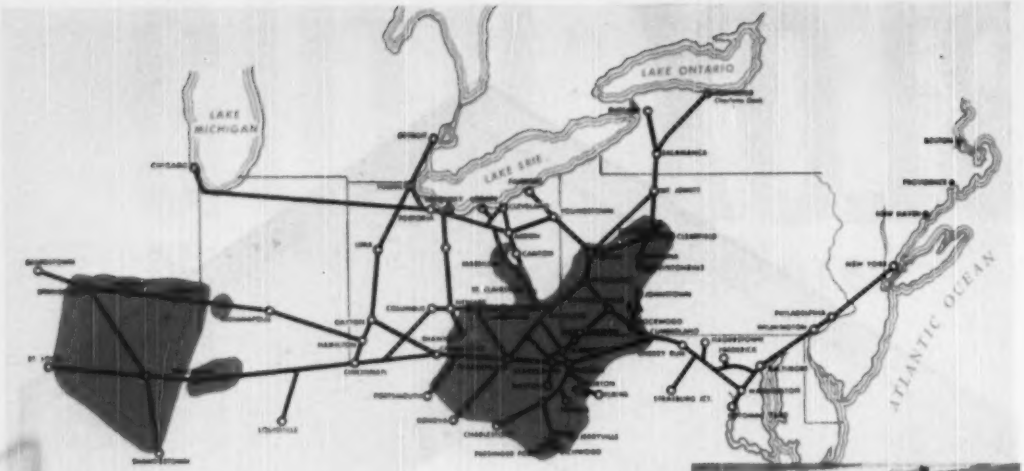

Coal is where you find it...

but economical B&O coals are within easy reach of the industries that need them

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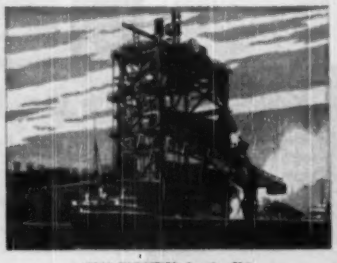
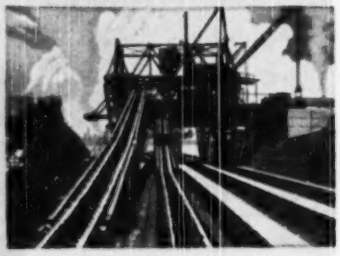
COAL FACILITIES, Toledo, Ohio



COAL FACILITIES, Lorain, Ohio



CURTIS BAY, Baltimore, Md.

This map should interest you. Note where the vast Bituminous deposits on the Baltimore & Ohio lie —then observe the strategic position of B&O rails serving the heart of industrial America. This is accessibility—the plus that means economy when you buy coals on the B&O!

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BITUMINOUS COALS FOR EVERY PURPOSE

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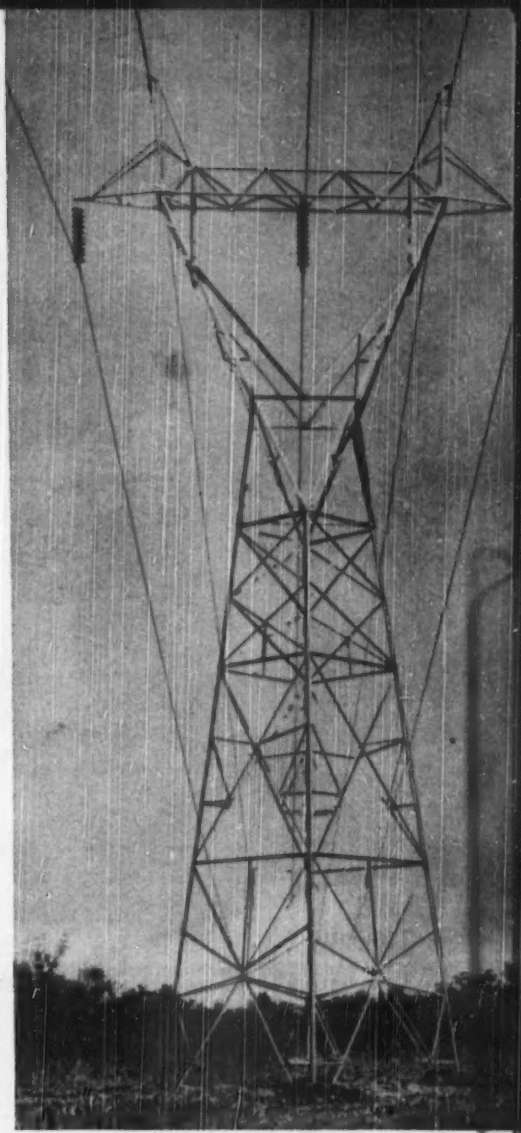
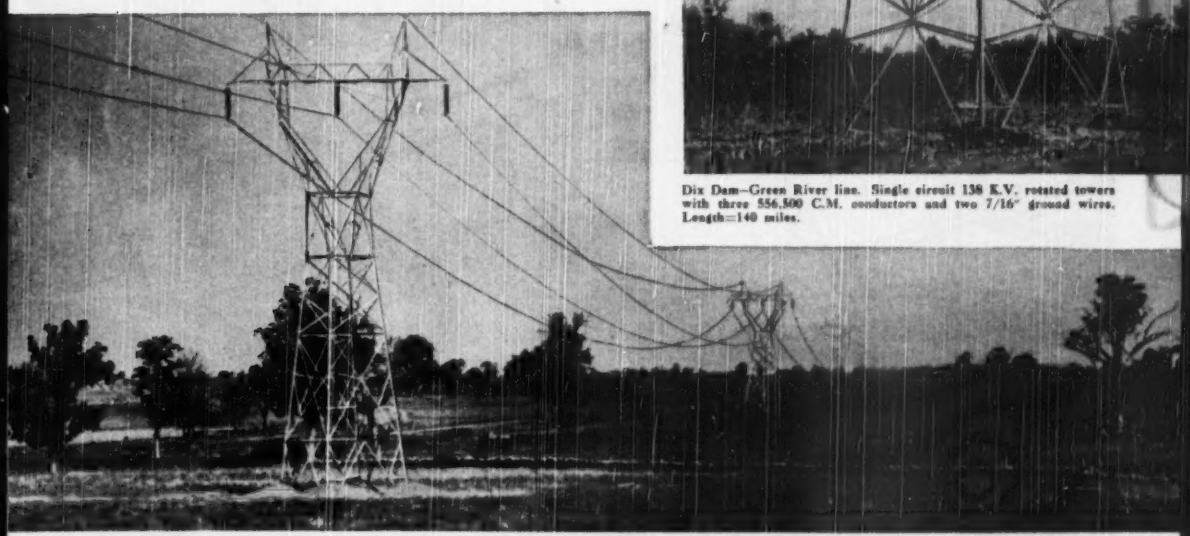


Dix Dam—Green River line. Single circuit 138 K.V. rotated towers with three 556,500 C.M. conductors and two 7/16" ground wires. Length—140 miles.



USS

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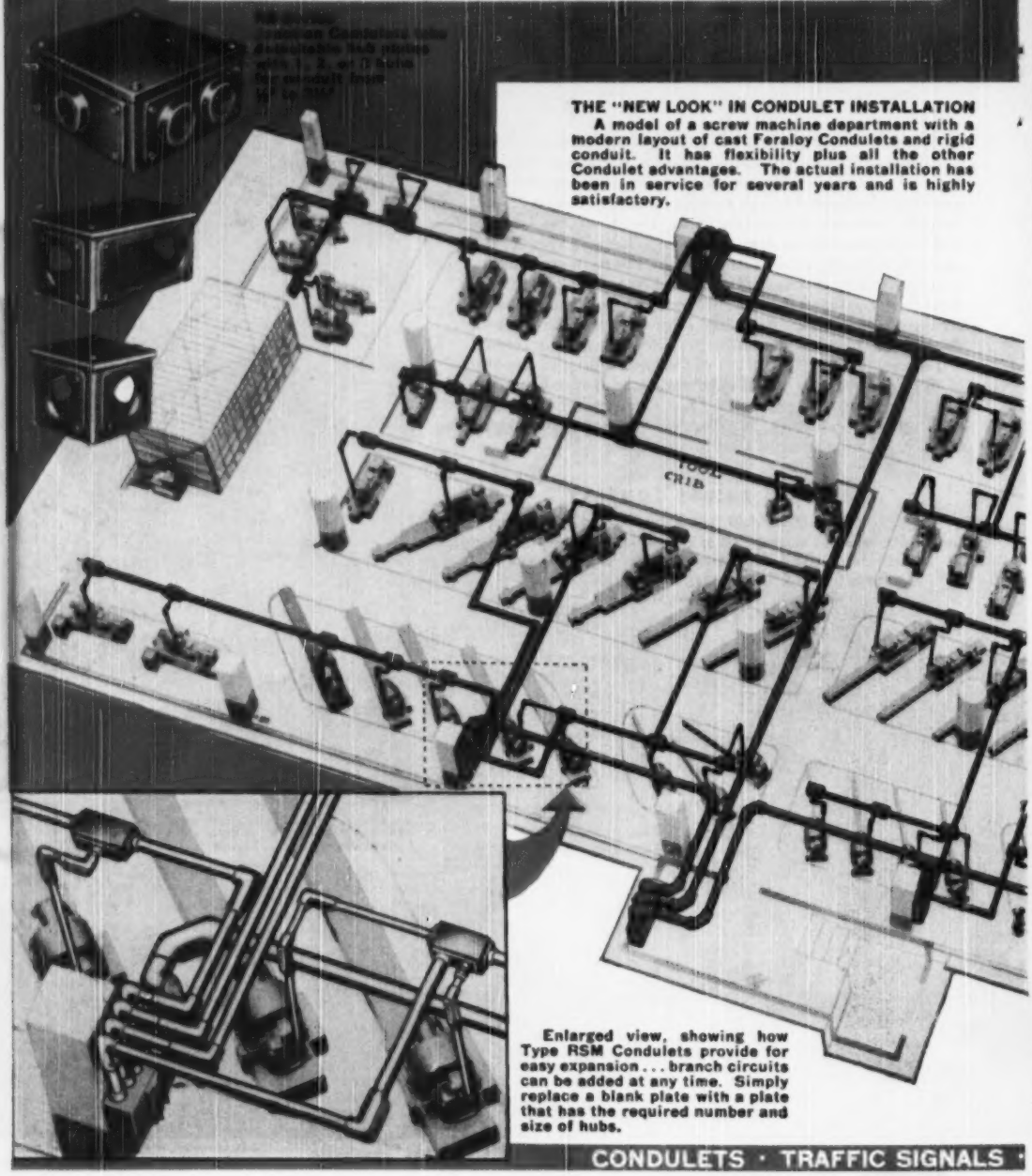
for MODERN WIRING... the conduit and CONDULET*



THE "NEW LOOK" IN CONDULET INSTALLATION

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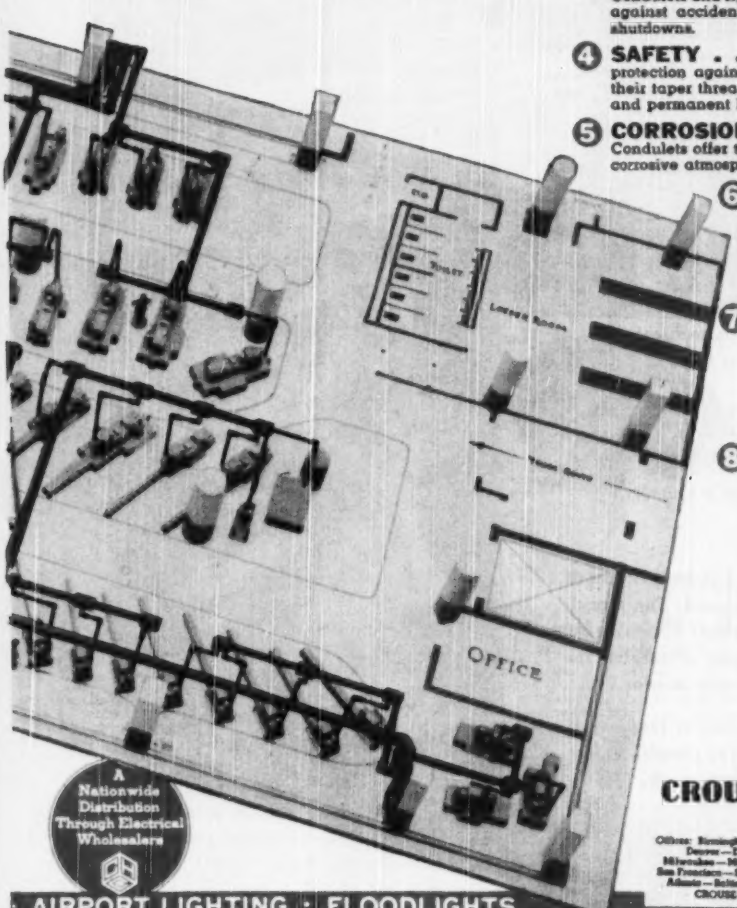
NEW ways of using the familiar Condulet and conduit material have produced outstanding results. Modern installation layouts meet industry's modern needs for flexibility while retaining the enduring protection and safety that can only be given by cast Feraloy Condulets and rigid conduit.



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*CONDULET is a coined word registered in the U. S. Patent Office. It designates a product made only by the Crouse-Hinds Company.

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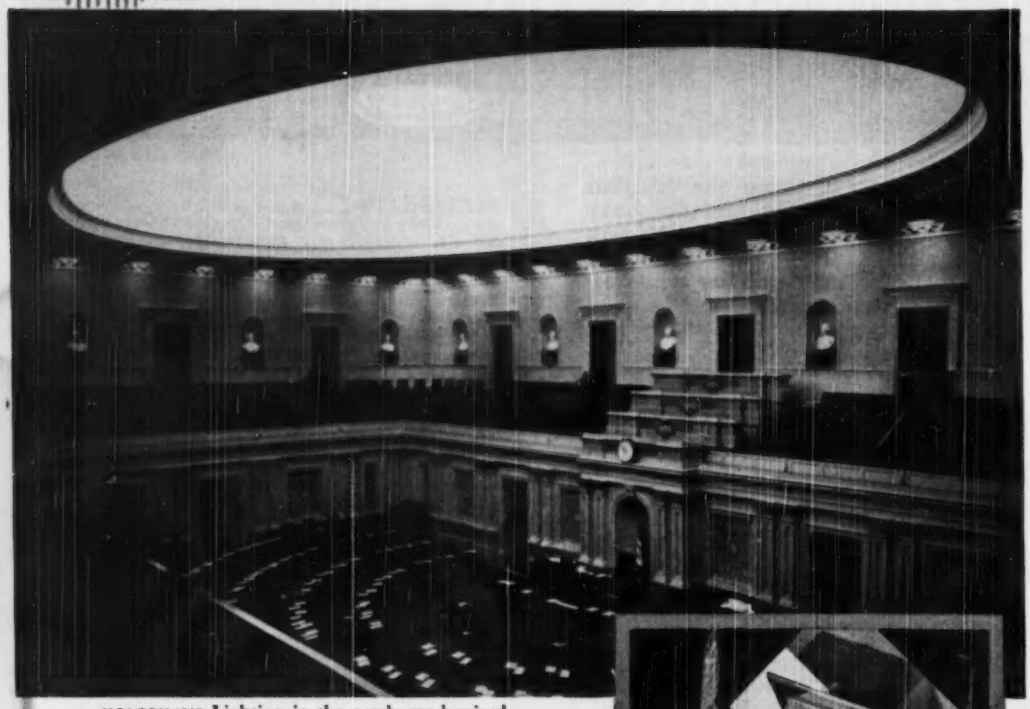
AIRPORT LIGHTING · FLOODLIGHTS

HOLOPHANE Lights Both Houses of Congress



HOLOPHANE Lighting in the newly modernized Chamber of the United States Senate.

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FRANCIS P. SULLIVAN, *Associate Architect*
THOMAS W. MARSHALL & JAMES M. GONGWER, *Consulting Engineers*
HARBESON, HOUGH, LIVINGSTON & LARSON, *Consultants*
LEO H. CLEARY, *Electrical Engineer*

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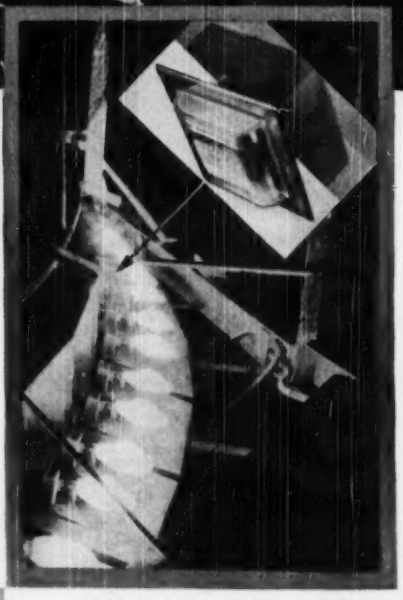
HOLOPHANE *Engineering Service, for which there is no charge, stands ready to help you with your needs.*



CONTROLENS® installation around cove—units open for relamping.

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These two specialized lighting fixtures were developed by Appleton engineers to provide safer, more efficient light for oil refineries, chemical plants, hospital surgeries—all locations where explosive or ignitible vapors, dusts or gases are present.

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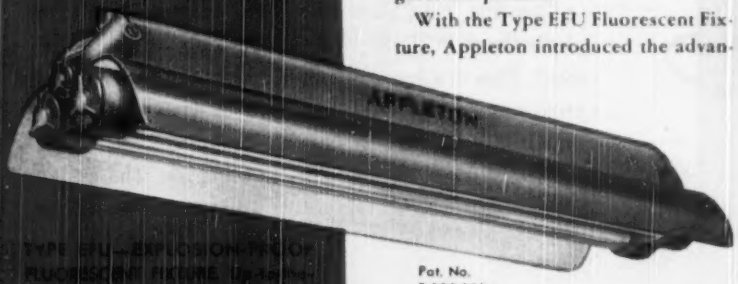
The Type EVX is the first and only Vented Explosion-Proof Lighting Fixture. Featuring porous metal cylinders, this fixture weighs thirty percent less than fixtures of similar performance rating, yet diffuses ten percent more light while operating at substantially reduced temperatures.

Whatever your illumination or electrical fitting requirements, specify Appleton—pace-setting manufacturer of electrical equipment for nearly half a century.



Pat. No. 2,392,202

Sold Through Electrical Wholesalers

APPLETON ELECTRIC COMPANY

1705 WELLINGTON AVENUE • CHICAGO 13, ILLINOIS

Branch Offices: NEW YORK, 50 Church Street • DETROIT, 3049 E. Grand Blvd. • CLEVELAND, 1836 Euclid Avenue • SAN FRANCISCO, 655 Mission Street • ST. LOUIS, 227 Frisco Bldg. • LOS ANGELES, 100 North Santa Fe Avenue • ATLANTA, 724 Boulevard N. E. • BIRMINGHAM, 429 Brown-Marx Bldg. • MINNEAPOLIS, 305 Fifth St., S. • PITTSBURGH, 414 Bessemer Bldg. • BALTIMORE, 100 East Pleasant Street • BOSTON, 10 High Street • DENVER, 1921 Blake Street • PHILADELPHIA, 1017 Cherry Street • CINCINNATI, 626 Broadway • HOUSTON, 738 M. & M. Bldg. • HAVANA, Cuba, Malecon No. 9.

Resident Representatives:

Binghamton, Dallas, Indianapolis, Kansas City, Orlando, Milwaukee, New Orleans, Seattle, Portland, Ore.

Export Representatives:

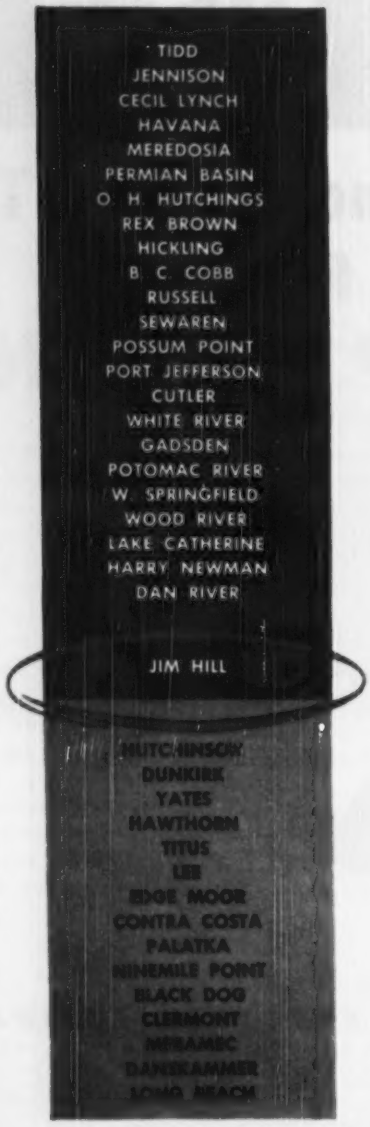
International Standard Electric Corp., 67 Broad St., New York 4, N. Y.

APPLETON

CONDUIT FITTINGS • LIGHTING EQUIPMENT • OUTLET AND SWITCH BOXES • EXPLOSION-PROOF FITTINGS • REELITES

NEW UTILITY STATIONS C-E EQUIPPED

Includes stations placed in operation since the war (in white) and those under construction or being engineered.



NEW

Designed to be the largest "kilowatt factory" between St. Louis and Memphis, the first section of the new Jim Hill Station of the Arkansas-Missouri Power Company was recently placed in service.

This fine, new, $6-million plant occupies a 90-acre plot between St. Francis, Arkansas and Campbell, Missouri. This is a location selected because of its general proximity to the Company's load center and the fact that it is high level land with an abundance of water relatively free of scale forming minerals. The design and construction of the entire project was under the supervision of Ebasco Services, Inc.

Now in operation is a 30,000-kw turbine generator served by a C-E Steam Generating Unit in the popular one-boiler, one-turbine arrangement. Plans call for an ultimate station capacity of 120,000 kilowatts. A sectional elevation and brief description of the C-E Unit appears on the opposite page.

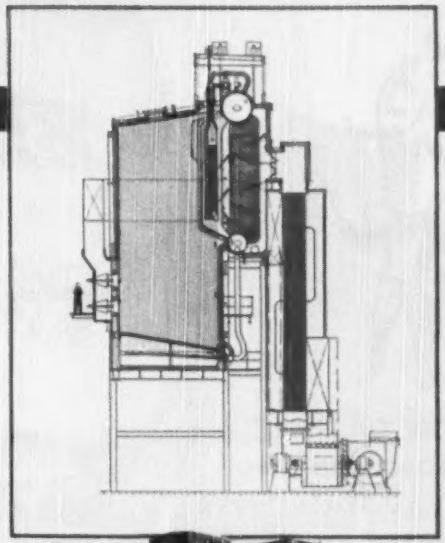
B-418

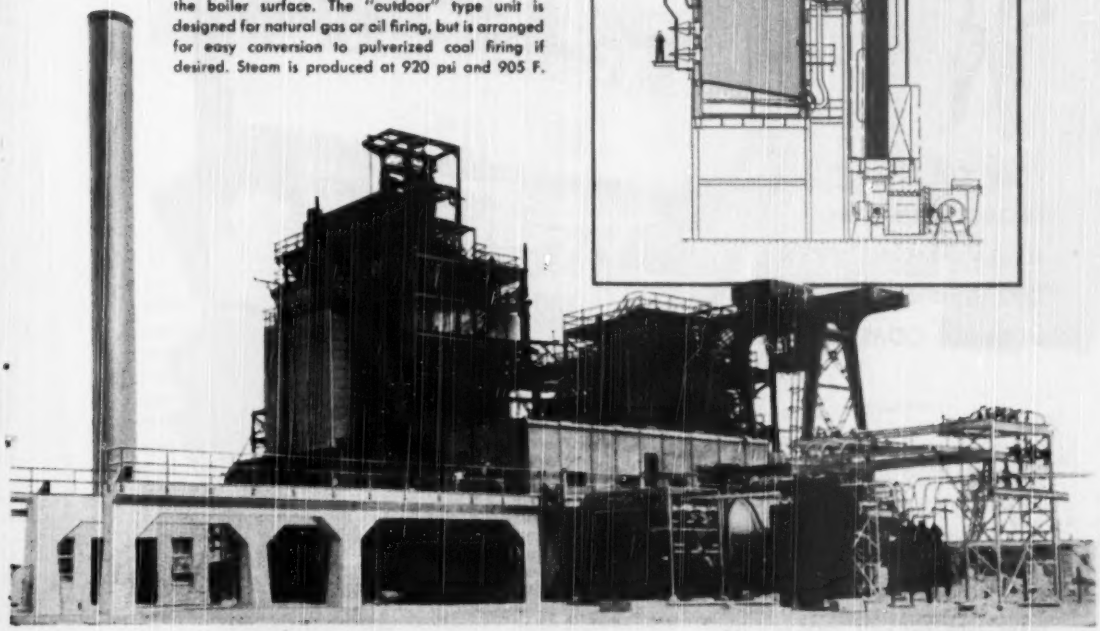
COMBUSTION ENGINEERING

A MERGER OF COMBUSTION ENGINEERING COMPANY, INC. AND THE SUPERHEATER COMPANY

Jim Hill Station goes into service

The cross-section at the right shows the C-E Unit which was recently placed in service at the Jim Hill Station. It is a 2-drum boiler with interbank superheater and has a tubular type air heater following the boiler surface. The "outdoor" type unit is designed for natural gas or oil firing, but is arranged for easy conversion to pulverized coal firing if desired. Steam is produced at 920 psi and 905 F.





—SUPERHEATER, INC.

200 MADISON AVENUE, NEW YORK 16, N. Y.

It's in the BAG

Here's a promotion idea to help peak up your load this Fall . . . a handy transparent Polythene "See-ability" bag that does two jobs to help sell more light bulbs.

First, it's a handy, attractive way to sell bulbs in *quantity* (holds practically any assortment of 7 to 9 bulbs); second, it has a hundred household uses: housewives will use it as a wrapper to keep bread, cake, and rolls fresh; as a vegetable bag in the refrigerator, a moi... proof lunch wrapper; for wet b... suits, soiled clothes, etc. It's big— ... 7" x 7", and it won't stiffen, crack, o... absorb moisture. Price of bags: $35 per ...

Remember, too, the Westingho... $28,000 Fall consumer contest and th... $3,500 dealer display contest!

Write NOW for details about the ... promotion. Lamp Division, Westing... Electric Corporation, Bloomfield, N...

YOU CAN BE SURE... IF IT'S Westinghouse

DESIGN LEADERSHIP

SQUARE D CONTROL CENTERS
provide MORE control in the SAME space

SQUARE D CONTROL CENTERS have provided substantial space savings in 70% of recent installations. The compact design of Square D starters and circuit breakers permits side-by-side mounting through SIZE 3. Free standing vertical sections have mounting provisions for individual control units built to minimum heights based on 3" steps. Each section has 78" height available for units. SIZES 1 and 2 non-reversing starters are 12" high; SIZE 3 is 15" high.

The control center illustrated above shows typical Square D space economy. The following is incorporated in only 188" L x 90" H x 20" D:

SECTIONS 1 AND 2 *(left to right)*—three starters and one space for 75 H.P. motors.

SECTIONS 3 THRU 7—two-speed starters for five 15/3.7 H.P. and two 30/7.5 H.P. motors. Starters for five 30 H.P., four 10 H.P. and two 2 H.P. motors. Three 50A frame branch circuit breakers.

SECTION 8—Six 50A frame branch circuit breakers.

SECTION 9—Three reversing starters and one space for 7 1/2 H.P. motors. (Pilot lights and push-buttons are mounted in covers without increasing standard unit sizes.)

If Space Isn't Your Problem— consider these important features:

Plug-In starter units slide on guide rails at four corners. Spring backed, silver plated stab fingers grip round vertical busses.

Safety Disconnect handle mechanism locks both door and disconnect with one to four padlocks. On closing unit door, handle moves to indicate ON or OFF.

Wiring Channels at top, bottom and both sides of each section are fully front accessible.

Write for Bulletin 8938. Square D Company, 4041 N. Richards Street, Milwaukee 12, Wisconsin

SQUARE D COMPANY

DETROIT · MILWAUKEE · LOS ANGELES

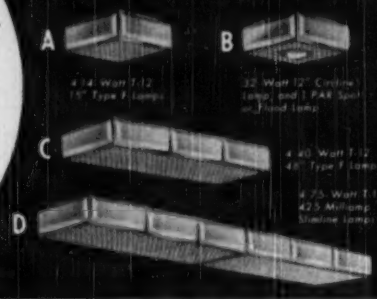
SQUARE D COMPANY CANADA LTD., TORONTO • SQUARE D de MEXICO, S.A., MEXICO CITY, D.F.

ONLY MITCHELL module LIGHTING CUSTOM-FITS

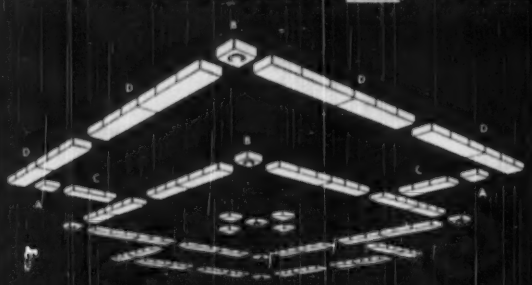
REG. U. S. PAT. OFFICE

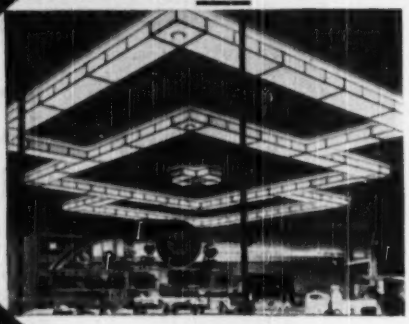
this MAGIC low-cost way

THESE 4 MODULES ARE THE "BUILDING BLOCKS" OF LIGHT


A
4-14 Watt T-12 15" Type F Lamps
B
32 Watt 12" Circline Lamp, and 1 PAR Spot or Flood Lamp
C
4-40 Watt T-12 48" Type F Lamps
D
4-75 Watt T-12 425 Milliamp Slimline Lamps

THEY FIT TOGETHER LIKE THIS . . . FOR LIGHTING MAGIC LIKE THIS





50,000 different patterns possible—20% more light!

Nothing in lighting compares with MODULE! Nothing in lighting matches MODULE's custom-fitting flexibility and economical high-efficiency.

It's amazing! With just 4 simple, low cost "building blocks of light," MITCHELL MODULE offers *unlimited* custom-fitting lighting patterns to fit any commercial interior. MODULE's exclusive plastic louver passes 20% MORE LIGHT. Simple fitting together of units (mechanically and electrically) permits low cost rearrangement of patterns at any time to suit changing needs. MODULE mixes all light sources smoothly in one harmonious, handsome system—puts the light exactly where it's needed. No ordinary fixtures can match MODULE—the *only* lighting that *custom-fits* with standard *low-cost* units.

Only MITCHELL makes MODULE

There's nothing in lighting like MODULE. It custom-fits and "grows" with every lighting need; it delivers more light; it stays beautiful, new; it costs no more than ordinary fixtures. If you haven't all the MODULE facts, write today for full descriptive details.

MITCHELL MANUFACTURING COMPANY
2525 N. Clybourn Ave. • Chicago 14, Illinois
In Canada: Mitchell Mfg. Co., Ltd., 11-25 Davies Ave., Toronto

YOU SELL module INSTALLATIONS WHEN YOU TELL THIS SELLING STORY

BIDDLE *Instrument News*

- ELECTRICAL TESTING INSTRUMENTS
- SPEED MEASURING INSTRUMENTS
- LABORATORY & SCIENTIFIC EQUIPMENT

NUMBER 1 OF A SERIES

JAMES G. BIDDLE CO., 1316 ARCH ST., PHILADELPHIA 7, PA.

BIDDLE APPLICATIONS ENGINEER COMPLETES 7000 MILE TRIP WITH IMPULSE CABLE FAULT LOCATOR

E. B. Curdts left Philadelphia March 31st for Houston, Texas to speak on April 20th before the Petroleum Industry Electrical Association on the subject of Grounding Principles and Practices as Applied to Industrial Plants.

Mr. Curdts demonstrated the new Biddle Impulse Cable Fault Locator to industrial and power companies from coast to coast in the course of his trek across the country. We see him here checking the installation of the instrument in the company car.

Designed primarily for locating faults on lead-covered cable installed in ducts, this new equipment has application also on aerial and buried cable. It has proved highly effective in utility and industrial service. If you have cable fault locating problems, write for a copy of Bulletin 65-W.

WHAT THEY SAY ABOUT THE "TTR" TRANSFORMER TURN RATIO TEST SET . . .

—From Transformer Manufacturers:

"We use this instrument almost continuously 24 hours a day, 5 days per week, and have come to depend on it as part of our production test facilities. Our experience has been that the instrument is accurate, dependable and generally very valuable in our work."

"You will be interested in hearing that your 'TTR' Tester has been doing an excellent job for us."

—From Large Power Companies:

"We like it very much,—don't know how we ever got along without it."

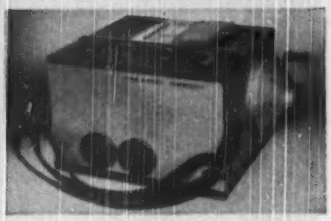
"The 'TTR' Set has proved valuable in making acceptance tests on new transformers and has materially reduced the time involved in testing."

"We have found the 'TTR' Set was successful in detecting a shorted section of turns in a transformer in operation, which permitted it to be taken out of service before more serious trouble developed."

"We consider the 'TTR' Set one of the most valuable instruments for our transformer work. It saves time and calculations, and gives more accurate results than the other methods we'd been using. Our transformer men depend on the set—so much—there is seldom a day the set is not in use."

The names of these and other companies using the "TTR" Set are

available on request. For information regarding this unique instrument, write for *Bulletin 55-W*.



ONE INSTRUMENT FOR PRACTICALLY EVERY ELECTRICAL RESISTANCE MEASUREMENT

Bridge-Meg Measures a Fraction of an ohm up to 1000 megohms—Wheatstone Bridge Included —Varley Loop Optional

Wherever insulation resistance tests are made, wherever a Wheatstone bridge is needed, this instrument, with its hand-cranked, constant voltage generator is always ready for detecting, diagnosing, and locating electrical faults. Weighing only 15 pounds, this multi-purpose test set is an ideal field tool which quickly pays for itself over and over again.

The Wheatstone bridge is particularly useful in connection with measurements of all manner of coils, resistors and circuits.

The Varley Loop makes possible the location of faults on wires in telephone, telegraph, signal and electrical power systems in industrial plants and power companies.

Electrical modernization programs should include modern measurement and test methods. You should have complete information on this versatile Bridge-Meg Resistance Test Set.

Write for Bulletin 21-60-W.

Is Your LITERATURE FILE *Up to Date?*

James G. Biddle Company
1316 Arch Street, Philadelphia 7, Pa.

Please mail literature checked at right:

- ☐ 65-W
- ☐ 55-W
- ☐ 21-60-W
- ☐ Complete list of new bulletins

Name _____

Job Function _____

Company _____

Address _____

City _____ Zone _____ State _____

- **STANDARDIZED DESIGN MAKES ORDERING AND INSTALLATION EASY**
- **COMPLETE AUTOMATIC RECLOSING EQUIPMENT IN SEPARATE CABINET**
- **FACTORY WIRED, ASSEMBLED AND TESTED . . . READY TO INSTALL**

STANDARDIZED TYPE "O" BREAKERS are easy to order, easy to install. More important, their standardization means that every rating and design is backed by a record of *proven performance!* That's why you can install Type "O" breakers *confidently* in any moderate capacity outdoor substation (see ratings below).

Full mechanically and electrically trip-free operating mechanisms assure instant tripping under *all* conditions. Fault or overload currents are cleared within 8 cycles . . . breaker opens and recloses within 30 cycles when connected for automatic reclosing. Breakers are equipped with non-radio-interference porcelain bushings, silver plated current carrying contacts, rigid cast steel top frame, d-c solenoid operator.

Get more facts on Type "O" breakers from your nearby A-C sales office.

ALLIS-CHALMERS, 932A SO. 70 ST. MILWAUKEE, WIS.

STANDARD RATINGS A-3071

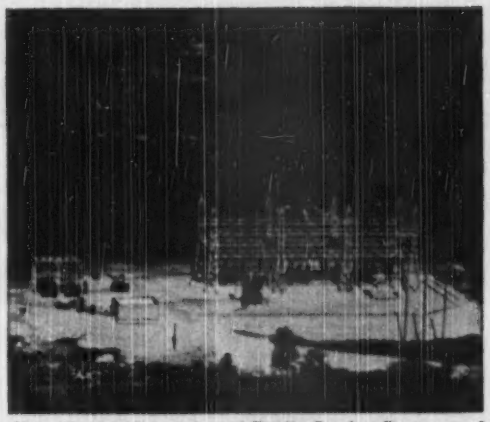
Type	Rated KV	Max. Design KV	Rated Amps. (60 cycle)	Interrupting Capacity KVA
OX-18	7.2	8.25	600	50,000
OZ-110	14.4	15.5	600	100,000
OZ-210	14.4	15.5	600	250,000
OZ-210	14.4	15.5	1200	250,000
OZ-210	23	25.8	600	250,000

ALLIS-CHALMERS

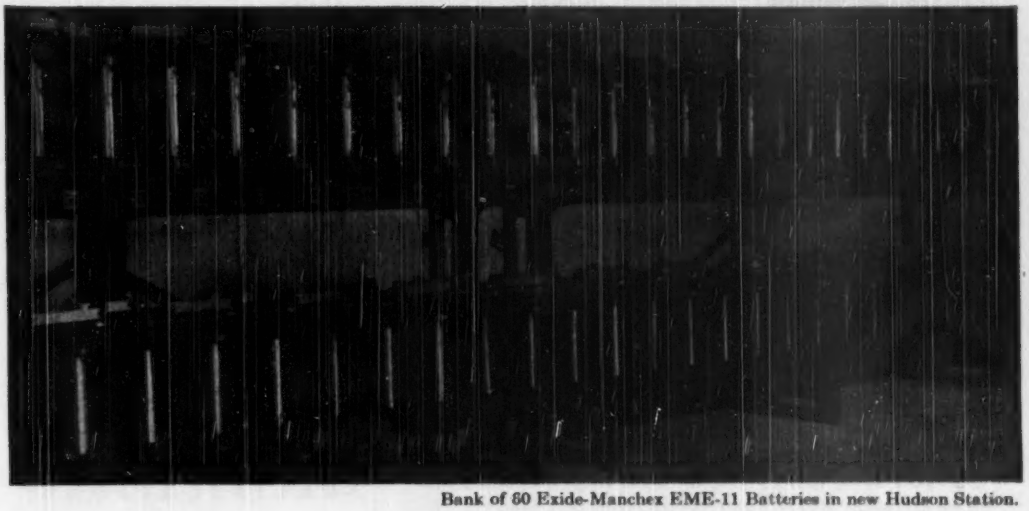
WRITE FOR BULLETINS 71B6165A and 71B6093C for ratings, dimensions and construction details of "Type O" Breakers.

In one of the country's newest and most modern substations...

EXIDE-MANCHEX BATTERIES



New Hudson Substation of Public Service Company of New Hampshire, a unit in the company's large expansion program. (Photo by P.S.Co. of N.H.)



Bank of 60 Exide-Manchex EME-11 Batteries in new Hudson Station.

The new Hudson Substation of Public Service Company of New Hampshire is one of the most efficiently designed and equipped in the country. It's on the Nashua terminus of a 115-kv transmission line from the recently constructed Schiller Mercury Steam Generating Station. Also, it is a terminus of a power exchange across the Massachusetts border.

In the battery room is a 60-EME-11 Exide-Manchex Battery, which is used for switchgear operation, emergency lighting and communication. Considered in its selection were its fine service record and many outstanding features, which include:

- the famous manchester positive plate with its *exclusive* lead button construction.
- slotted plastic separators, impervious to chemical and electrical reaction.
- plastic spacers that maintain plate alignment.
- the latest development in molded glass jars.
- heavy terminal posts with copper inserts for extra conductivity.

Combined, these and other outstanding characteristics assure you of *positive* switchgear operation. Use the Exide-Manchex for all stationary battery applications in central and substation service.

THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia 32

Exide Batteries of Canada, Limited, Toronto

"Exide" and "Manchex" *Reg. Trade-marks U.S. Pat. Off.*

1888 • DEPENDABLE BATTERIES FOR 62 YEARS • 1950

Everywhere you hear "#1100 is a Find for windings!"

That's why hundreds of new users have switched to ***Irvington #1100*** *clear, stable insulating varnish*

One Trial did it in the many shops now standardizing on Irvington #1100. Their endorsements boil down to: "We like its stability in dip tank and in storage . . . its clear color and low cost. We use this one varnish on practically all our windings, and cut inventories."

They like its oil and chemical resistance, too . . . the way this new insulating varnish sinks into remote coil layers and grips the wire, forming a solidly bonded mass. Internal-curing, it hardens throughout after a short bake, to a durable, oil-proof coating. The solvent is V. M. & P. naphtha, which does not attack other insulating materials.

Irvington #1100, backed by heavy research, excels on all windings except those operating at highest speeds. One varnish does all, and saves you real money, too. Write for a sample.

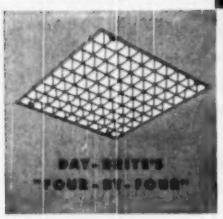
SPECIFICATIONS:

Dry Dielectric	2000 VPM
Moisture Resistance	Good
Oil Resistance	Excellent
Acid Resistance	Excellent
Alkali Resistance	Good
Heat Resistance	Very Good
Penetration	Excellent
Baume	25° @ 30 deg. C.
Sp. Gr.	0.903 @ 30 deg. C.
Sp. Gr. for use	Optional
Solvent	V. M. & P. Naphtha

Look to Irvington
for Continued Leadership in Insulation

IRVINGTON VARNISH & INSULATOR CO.
Irvington 11, New Jersey

Alameda Road Shop, Singer Sewing Machine Company, Kansas City, Missouri



FOUR SQUARE FEET OF DE LUXE LIGHTING

Here's modern, distinctive lighting that only the word "fine" describes.

FINE IN ARCHITECTURAL POSSIBILITIES . . . the Day-Brite "Four-by-Four" unit . . . a whole host of wonderful new lighting patterns for store, office, lobby ceilings at the command of your imagination . . .

FINE IN ENGINEERING . . . integrated lighting design advanced to a new high peak of efficiency . . .

FINE IN QUALITY . . . performance and durability second to none . . . sensationally simple maintenance . . . all the *value* that famous Day-Brite quality guarantees.

"DECIDEDLY BETTER"
DAY-BRITE
Lighting Fixtures

PREMIUM QUALITY WITHOUT PREMIUM COST

037

The entire fascinating "Four-by-Four" story is yours for the asking. Write today for Bulletin 20-C.

037

Day-Brite Lighting, Inc., 5425 Bulwer Ave., St. Louis 7, Mo.
In Canada: Amalgamated Electric Corp., Ltd., Toronto 6, Ontario

THE PROOF *is in the service records!*

There is no better proof of the superiority of Amcreco Poles, Cross Arms and Conduit than the actual service records. It is the best indication of the long pole life and freedom from maintenance troubles for users of Amcreco. We will be pleased to show you typical service records and point out how Amcreco can reduce your cost per pole per year. Write today.

Amcreco
Lowry Process
Creosoted Products

AMERICAN CREOSOTING COMPANY
INCORPORATED
COLONIAL CREOSOTING COMPANY
AMCREO
GEORGIA CREOSOTING COMPANY
LOUISVILLE, KENTUCKY

POLES • CROSS ARMS • CONDUIT

Urgently Needed!

The addition of

1000 MEN!

to the Lighting Sales and Service Staffs of the Electric Light and Power Companies to Help Put Over the Planned Lighting Program

Wherever the full support of personal sales follow-up is given to the educational and promotional phases of the Planned Lighting Program, the soundness of that program is amply demonstrated.

Unfortunately, most lighting sales and service departments are undermanned. They do not have the personnel with which to do the type of selling job required to take complete advantage of the load-building opportunities existing today in Industrial Lighting and all other types of lighting.

LIGHTING SALES DEPARTMENTS SHOULD BE REBUILT. The facts are, that too many departments are below pre-war levels, while —with increases in population, factories and commercial establishments —the personnel in these departments should be at the highest levels in history!

Now that generating capacity shortages are definitely behind us, and reserve capacity is steadily increasing, the number of men engaged in lighting sales ought to be increased substantially, even doubled and tripled!

Men with the necessary basic education and training are now available. These men should be trained to familiarize themselves with the production and lighting problems of their customers. They should be trained to effectively portray the benefits of good lighting and the importance of Industrial Lighting Equipment which meets nationally recognized standards.

INSISTENCE UPON HIGH QUALITY LIGHTING UNITS IS ESSENTIAL, to the success of any lighting plan. And bound up in the lighting plan's success is the reputation of the utility company in the mind of the buyer. For in the final analysis, it is the utility company which will share at least part of the blame for failures that may result because of inadequate or sub-standard lighting equipment.

BUYERS MUST BE GIVEN THE FACTS about the importance of high quality lighting equipment to the lighting plan. It is of vital importance therefore, that these new lighting men be trained to provide customers with all of the facts about the basis for determining standards of durability and performance in Industrial Lighting Units.

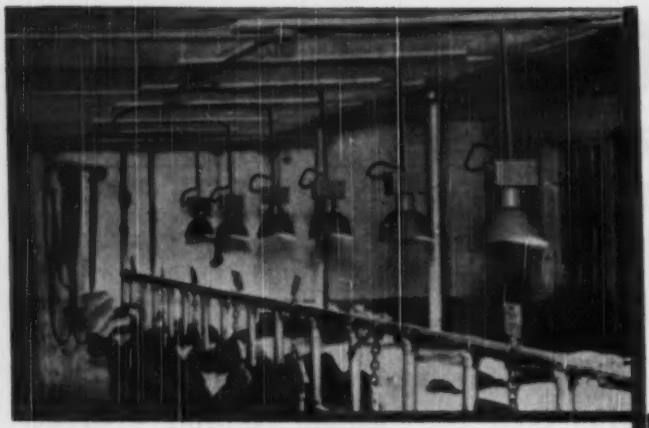
The RLM Standards Institute will gladly assist Electric Light and Power Companies in such training by providing, at no cost, adequate quantities of the new RLM STANDARDS Specification Booklets. Recently revised and completely up-to-date, this book contains the RLM standard specifications for 18 fluorescent and incandescent Industrial Lighting Units. Also included in this book, are facts about the inspection and certification program sponsored by the Institute which are valuable in giving the buyer a complete understanding of the RLM Label and its importance to him.

For copies and other assistance, write RLM Standards Institute, Suite 821, 326 W. Madison St., Chicago 6, Ill.

A timely Message to the MANAGEMENTS of the Nation's Electric Light and Power Companies published in the interest of the entire Lighting Industry

RLM

RLM STANDARDS INSTITUTE



IN THE BARN . . .

. . . OR UNDER THE BARNYARD

You can depend on neoprene-jacketed cable for resistance to rot and weather

In the barn, neoprene-jacketed cable resists deterioration from condensed moisture, acid and fungus—won't propagate flame. Outside, neoprene withstands sunlight, heat, cold, weathering and aging when used as aerial cable . . . crushing, corrosion, rot and abrasion when buried underground.

So next job, make sure you use cable that's designed for long, trouble-free service—with a jacket of Du Pont neoprene. Although Du Pont does not make neoprene products, leading wire and cable manufacturers use neoprene for their quality constructions. Your distributor can supply you. And if you'd like to read about new neoprene applications that may help *you*, we'll gladly put you on our mailing list for "The Neoprene Notebook." Write: E. I. du Pont de Nemours & Co. (Inc.), Rubber Chemicals Division G-7, Wilmington 98, Delaware.

NEOPRENE

The rubber made by Du Pont since 1931

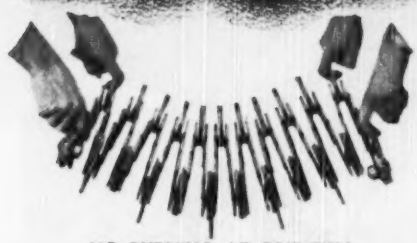
DU PONT

SAVE UP TO 1/6 ON UP-KEEP

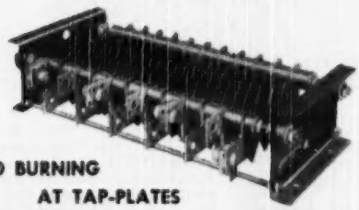
Periodic Tightening of Clamping Nuts Eliminated With EC&M Tab-Weld Plate Resistors

1. INSPECT MOTOR
2. CHECK CONTROL PANEL
3. ADJUST BRAKE
4. TEST LIMIT STOP
5. EXAMINE MASTER SWITCH
6. TIGHTEN ~~RESISTOR~~ NUTS

TAB WELD PLATE RESISTOR



NO BURNING AT GRID-EYES



NO BURNING AT TAP-PLATES

EC&M TAB-WELD Plate Resistors provide the opportunity to reduce upkeep by a new construction which has shown excellent operating results.

This construction brings grid-eyes into intimate contact, eliminating the electrical connectors previously required between grids. Spot welding the tab-ends of the grids maintains the intimate contact and provides a continuous path without depending on the pressure of the end clamping nuts. Burning at tap-plates is also eliminated by spot welding the tap-plates to the ends of the mated grids.

In addition to elimination of trouble in concealed areas of the sections, EC&M TAB-WELD Plate Resistors have other cost-saving features. These are: stabilized resistance value, simplified tap-shifting with several tap-plates permitting convenient adjustment for best motor operation, metal tap-plate identification tags, corrosion-resisting qualities, etc. *Write for Bulletin 942 giving complete details.*

A reduction in preventive maintenance is a plus value — specify EC&M TAB-WELD Plate Resistors.

THE ELECTRIC CONTROLLER & MFG. CO.

2698 EAST 79TH STREET • CLEVELAND 4, OHIO

"Thanks to extra traction and proper weight distribution...

we beat deadlines... without wasting dollars"

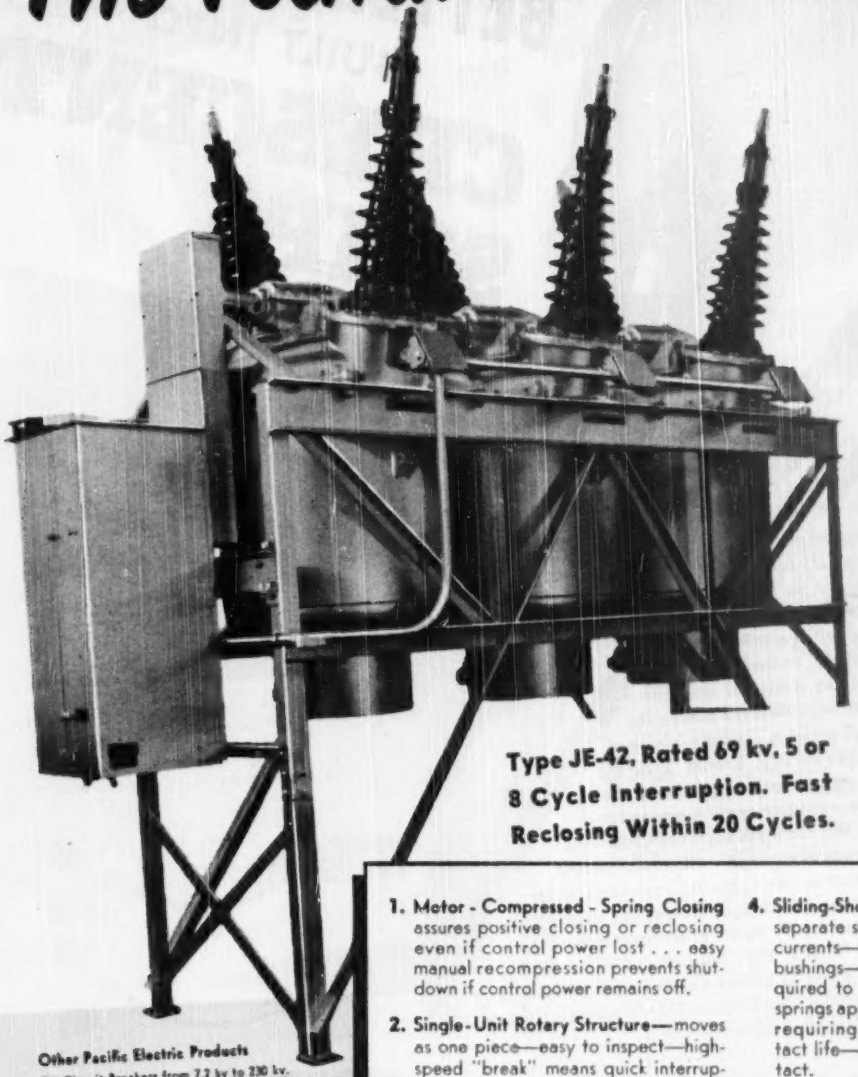
Sure, you want jobs rushed thru on schedule! But as a cost-conscious executive, you also want speed *without wasteful use of equipment capital.* And that's exactly why FWD is first choice—wherever conventional trucks have roughest going and shortest life. The FWD principle of driving power on each wheel gives you many unmatched advantages. Extra traction rolls the FWD safely and swiftly over terrain that challenges ordinary vehicles. Balanced distribution of load and power minimizes strain and wear. Maintenance and "down-time" are slashed . . . creating more *productive time* and more *productive dollars* for you!

GET FULL FACTS on 38 standardized FWD motorized units. Each combines truck and equipment into one complete, easy-to-buy package—matched to your particular needs. One central responsibility for all equipment. See Graybar or write FWD direct.

THE FOUR WHEEL DRIVE AUTO CO.
Clintonville, Wisconsin • *Canadian Factory:* Kitchener, Ont.
World-Wide Sales and Service

Built by the Makers of America's Foremost Heavy-Duty Trucks

Pacific Electric BREAKERS Have *The Features You Want*



Ratings Available
Type JE-42E
69 kv 600 amps
1,000,000 interrupting kva

Type JE-42F
69 kv 1200 amps
1,500,000 interrupting kva

Type JE-42G
69 kv. 1200 amps
2,500,000 interrupting kva

Conforms to AIEE and NEMA Standards

Type JE-42, Rated 69 kv, 5 or 8 Cycle Interruption. Fast Reclosing Within 20 Cycles.

1. **Motor - Compressed - Spring Closing** assures positive closing or reclosing even if control power lost . . . easy manual recompression prevents shutdown if control power remains off.
2. **Single-Unit Rotary Structure**—moves as one piece—easy to inspect—high-speed "break" means quick interruption.
3. **Simple Interrupter**—a glance shows whether or not it is "in order."
4. **Sliding-Shoe Nested Contacts** provide separate surfaces for arcing and load currents—eliminate static stress on bushings—no sensitive adjustment required to fix closed position—leaf springs apply nearly constant pressure, requiring no adjustment during contact life—"wiping" assures clean contact.
5. **Low Operating Current** a-c or d-c.
6. **Shipped Assembled**—tested and adjusted.

Other Pacific Electric Products

Oil Circuit Breakers from 7.2 kv to 230 kv. Service Restorers 7.2 and 15 kv. Air Break Switches from 7.5 kv to 230 kv. Disconnects from 7.5 to 115 kv. Distribution and Power Fuse Cutouts and Supports. Bus Fittings and Terminals.

Get All Facts . . .

Call

PACIFIC ELECTRIC MFG. CORPORATION

5815 THIRD STREET SAN FRANCISCO 24, CALIFORNIA

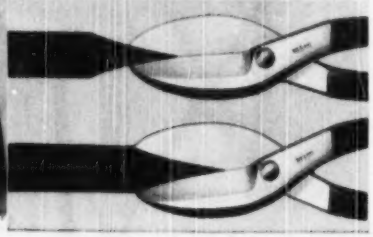
Other Representatives in Principal Cities

"BETTER CUTTING" BUILT INTO CRESCENT SNIPS

● The cutting edges of Crescent Snips are not *inlaid*. The edges, as well as the entire tool, are made of a solid forging of special-analysis steel. The blade cross-section of this forging is so designed that the outside surface is ground off before the denser "inner" metal is *specially hardened* to assure longer-lasting, keener shearing blades. Very important too, Crescent Snip blades have their cutting tension ground in—not sprung in. But the open secret of Crescent's most conspicuous advantage—effortless cutting through the entire stroke—lies in Crescent's scientific blade contour. With a Crescent, the shearing angle is the same at the finish as at the start of the cutting stroke. That's why you can cut right out to the blade tips. There is a Crescent Snip for every need —4 Patterns, 9 Sizes. Sold by leading Hardware Dealers and Industrial Distributors everywhere.

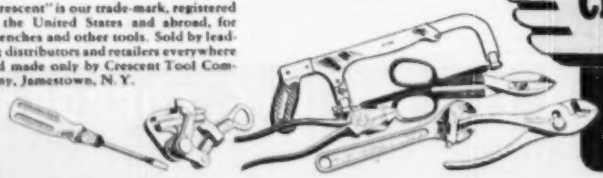
Above: *Crescent Snips are ground on automatic machines thus assuring absolute uniformity.*

Below: *The Shearing angle of Crescent blades remains the same throughout the entire cutting stroke.*



CRESCENT TOOL COMPANY, JAMESTOWN, N. Y.

"Crescent" is our trade-mark, registered in the United States and abroad, for wrenches and other tools. Sold by leading distributors and retailers everywhere and made only by Crescent Tool Company, Jamestown, N. Y.



CRESCENT TOOLS

Sign of the Artisan
Symbol of Excellence

IT TAKES LESS THAN
half the torque
TO TIGHTEN THIS

KYLE type HD two-bolt HEAVY DUTY CONNECTOR

Here's an ideal connector for heavy stranded wire from 2/0 to 1000 MCM. It's easy on cable; gives a firm, low-resistance connection that stays cool; bolts won't drop out; it's easy to tighten, and it just won't come loose!

The tightening force is applied by two bolts which accommodate the standard lineman's wrench instead of the large wrench required for split bolt connectors of the same size. As the table below shows, tightening torque required is quite low—which linemen will like—and which, along with the copper spacer bar, prevents crushing and distortion of strands.

Easy to Install

The self-aligning body and cap insure easy starting and threading of the bolts. The bolts are held in the body by a retaining ring, making it impossible for them to drop out during installation. The spacer is also retained in the body for proper positioning. It is only necessary to place the connector over one conductor, engage the bolts, insert the tap wire, and tighten. The connector will take two conductors of the rated size, or one conductor of that size and any smaller size tap-off.

Easy to tighten—stays tight!

SIZES	RECOMMENDED TIGHTENING TORQUE	
Stranded Wire	Per Bolt, for type HD Connectors	For Split Bolt Connectors
2/0	120 inch-pounds	600 inch-pounds
4/0	200	750
350 MCM	275	900
500 MCM	350	1000
750 MCM	500	1200
1000 MCM	600	1400

Photo shows the 350 MCM size of the Kyle HD Connector. Body and cap are copper base alloy; spacer bar is copper; bolts are silicon bronze. The connector is also furnished zinc plated, for conductors other than copper. It is designed so as to give a tight, low-resistance connection without distortion of the strands. The nicely-rounded body makes it easy to do a good tape job. The connector is easy to tighten, stays tight, and has many other advantages over split bolt connectors—yet it costs even less! It's a good job, and a good buy for you. Why not try it?

For samples and prices ask the L-M Field Engineer; or write or wire Line Material Company, Box 2077, Milwaukee 1, Wisconsin (a McGraw Electric Company Division).

7910

LM®

LINE MATERIAL Kyle Connectors

Complete Coordinated Equipment for Distribution Today

NOW L-M GUY CLAMPS

with *New* TORKOL-*Treated Nuts*

have 2.7 times the clamping power

Plus

- nuts go on more easily
- vibration does not loosen nuts
- rusting of nut threads is greatly reduced—nuts come off more easily, and may be reused

WHAT TORKOL IS AND WHAT IT DOES

TORKOL is an exclusive L-M product applied to the nuts of L-M guy clamps. It is a lubricant that increases the effective clamping power from 2.7 to 3.3 times for any given amount of torque.

Proved by 5 Years of Field Testing . . .

now adopted as standard for these reasons:

TORKOL does not creep or flow to adjacent electrical contacting parts under normal outdoor temperatures; it is not affected by weather changes or rain or sleet.

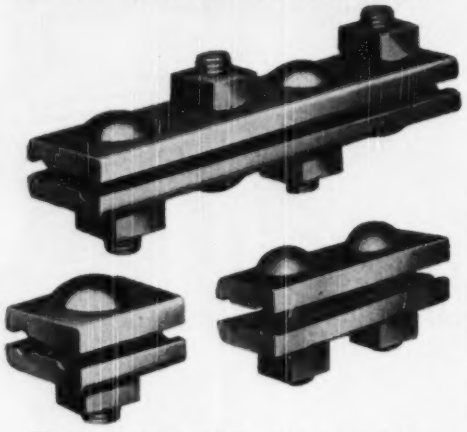
TORKOL is not appreciably displaced when the nut is tightened. Therefore it protects the threads from damage and rusting, permitting easy removal of the nut when desired. And nuts may be reused.

Vibration does not loosen **TORKOL**-treated nuts.

TORKOL is clean, dry. It does not discolor hands, gloves, or clothing. It does not collect dust.

ALL L-M guy clamps are furnished with **high strength bolts.** Nuts only are treated with **TORKOL,** which is colored yellow for identification.

L-M GUY CLAMPS



Heavily galvanized steel, in one to four bolt sizes, from $1\frac{7}{16}$" to 8" long, light or heavy weight, for wires from $\frac{1}{4}$" to $\frac{7}{16}$". Furnished with high strength bolts and **TORKOL**-treated nuts, at **NO extra cost.**

Bolts are opposed as shown. Oval holes in both plates permit inverting the oval shank bolts. Smooth grooves with rounded ends prevent damage to wire.

For details on these and other clamps, and samples of **TORKOL**-treated nuts **ask the L-M Field Engineer or write Line Material Company, Milwaukee 1, Wisconsin.**

7124

LINE MATERIAL Pole Line Hardware

Complete Coordinated Equipment for All Distribution Requirements

PROTECTION TODAY

L-M GROUNDING HARDWARE

adds impulse strength on 34.5–46 kv lines

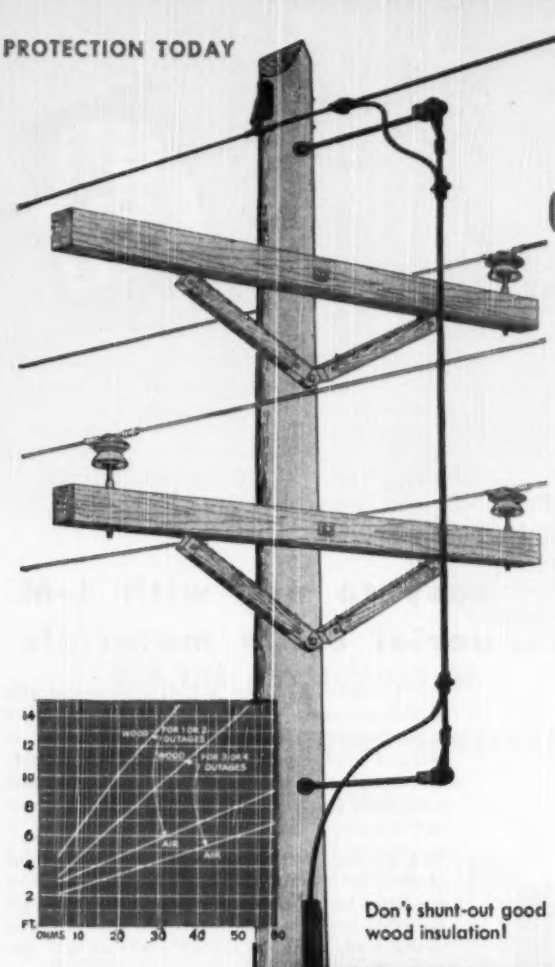
On installations using overhead ground wires, if the grounding down-lead is installed so that it shunts out the wood insulation of the pole, it can reduce or nullify the value of an otherwise good pole-top assembly.

Practical experience has shown the value of getting the down-lead away from the pole. This separation can be made economically with the L-M hardware shown below.

Coordination of wood and air gap dimensions and grounding resistance is the formula.

To simplify the calculation, the estimating chart at the left was developed by Frank E. Sanford as Consulting Engineer for Line Material.

Ask the L-M Field Engineer for a copy of Mr. Sanford's report of a nationwide survey of practices, together with a folder on the transmission hardware items required and a large size copy of the Sanford chart. Or write Line Material Company, Milwaukee 1, Wisconsin (A McGraw Electric Company division).



Don't shunt-out good wood insulation!

Sanford Estimating Chart for determining minimum air and wood paths for any measured ground resistance. A large size copy is available from L-M.

Some L-M Grounding Equipment for 34.5–46 kv lines

Here are a few of L-M's many transmission and distribution line construction materials. These are steel, hot-dip galvanized by L-M's modern quality-control methods. All bolts have buffer points to make them easy to drive.

SOME L-M GROUNDING EQUIPMENT FOR 34.5–46 kv LINES

(A) Extended Type Bracket for neutral wire down-lead. Pole-mounted as shown in illustration above. Lengths from 3'2" to 4'6".

(B) Loop Bolt for pole top hanging of overhead ground wires. Lengths 11½" and 13½" for pole diameters up to 10".

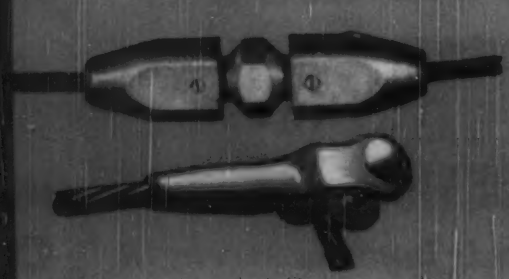
(C) L-M Suspension Clamp. Forged steel, heavily galvanized. Hangs from the Loop Bolt to hold the overhead ground wire.

7759

LINE MATERIAL

Line Construction Materials

Complete Coordinated Equipment for Distribution Today



L-M FARGO MESSENGER SPLICES AND DEAD ENDS

Both splice and dead end are available in choice of nut type, like the splice shown, for tightening on the ground, or in fully automatic, shown by the dead end, in which a slight cable tension sets the cones automatically. High strength bronze shell, cones, and lock screws. For Copperweld to ⅝".

OTHER L-M HARDWARE FOR AERIAL CABLE

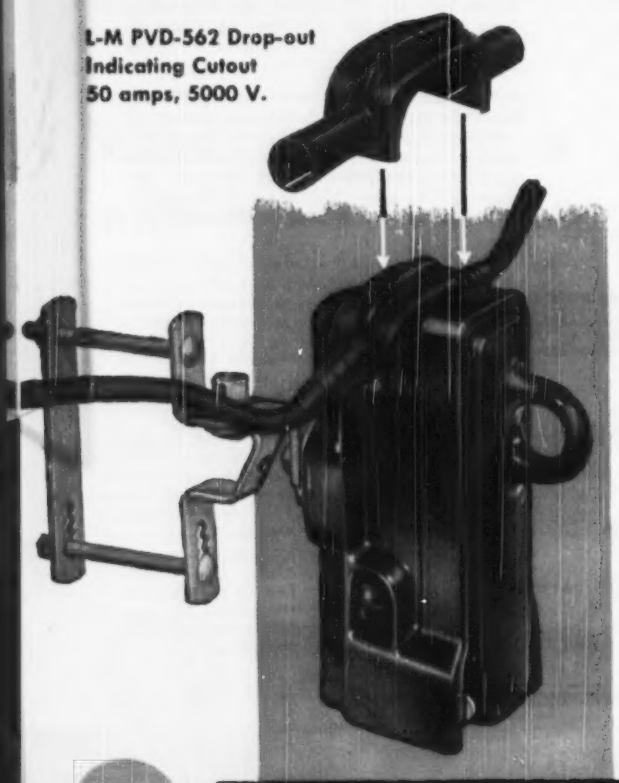
L-M provides many useful items, such as the double upset extension bolt, which holds messenger clamps with adequate pole clearance; and the double suspension hanger, which supports messenger during stringing, and grips it permanently after bolts are tightened. Steel, with all parts hot dip galvanized.

Free!

THIS HANDY GUIDE

Illustrates and describes types of cable, stringing methods, materials, typical installations; 32 pp, indexed. Ask the L-M Field Engineer or write Aerial Cable Materials Division, Line Material Co., Milwaukee 1, Wisconsin.

aerial cable... easy to use with L-M aerial cable materials



L-M PVD-562 Drop-out Indicating Cutout 50 amps, 5000 V.

No "Johnny-come-lately" is L-M in this aerial cable materials business. For years L-M men have worked right alongside of designers, erectors, and users, to test and develop materials that would help simplify the stringing of self-supporting aerial cable, and would help the user enjoy the maximum in service and long life.

In L-M's hardware department, the extensive line of aerial cable materials rates a special division. A few items are shown on this page; many more are described in the bulletin mentioned above. And of course many of L-M's regular hardware and specialty items find application in aerial cable installations.

Discuss your aerial cable problem with the L-M Field Engineer who may give you valuable suggestions; or write Aerial Cable Materials Division, Line Material Company, Milwaukee 1, Wisconsin.

New! L-M aerial cable fuse cutout

The first drop-out cutout designed specially for aerial cable. Same indicating and operating features as the famous L-M PVD-56. But here the conductor runs right through a slot in the top.

You don't cut the cable. Just skin it and drop it into the slot. A copper-jawed clamp grips it firmly without deforming the conductor. The flexible synthetic hood waterproofs the top of the box and protects cut ends of the insulation. Ears of the hood are wrapped around the cable and taped. Makes a neat, fast installation.

LINE MATERIAL...Pole Line Hardware

Complete Coordinated Equipment for All Distribution Requirements 2125

ROUND WOUND
COILS
L-M
CORE
REG. U.S. PAT. OFF.

protected with oxidation resistant
ORTO
transformer oil

GET THE ADVANTAGES OF L-M ROUND-WOUND TRANSFORMERS ... NOW EVEN GREATER WITH "ORTO"* OIL

Among the many advantages of L-M's exclusive Round-Wound design are high short-time overload capacity, high impulse strength, and long life for the transformer, with low maintenance and low operating costs.

These advantages have been outstanding, even in L-M Round-Wound transformers using high-grade conventional oils.

Today, L-M Round-Wounds (and other L-M distribution transformers) are supplied filled with "ORTO" brand oil. Because it is a high-grade inhibited oil, "ORTO" greatly enhances the advantages inherent in the Round-Wound design. Because "ORTO" maintains its original condition for many years, the transformer itself maintains its initial high overload capacity for a much longer time.

Because the oil is kept free from acids, insulation is not subject to deterioration by oil acids; and the transformer maintains its high impulse strength for a far longer period.

Because all parts of the transformer share in the long life, maintenance costs are lower, and operating costs remain at a low level for a much longer period. Thus with "ORTO" brand oil, L-M Round-Wound transformers offer an even greater return on the investment to their users.

look for the Green Shield!

L-M distribution transformers with "ORTO" brand oil are available in conventional, Completely Self-Protected, and subway types, single-phase and three-phase units. For information ask the L-M Field Engineer, or write Line Material Company, Transformer Sales Department, Zanesville, Ohio (a McGraw Electric Company Division).

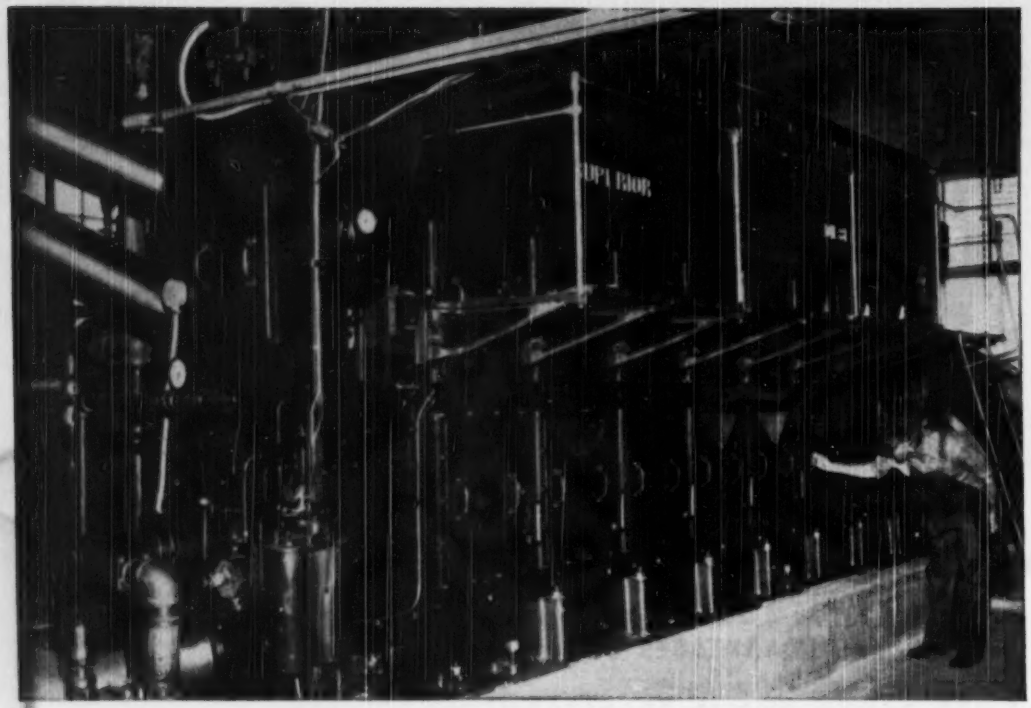
*Trademark

LM

10-4

LINE MATERIAL ... Transformers

Complete Coordinated Equipment for Distribution Today



How Superior's Dual Fuel Feature Saved $10,000 in Six Months

Superior's Dual Fuel feature has opened the door to lower power costs in many installations. Recently one of our customers told us that by operating on gas, a Model 80 Dual Fuel Superior saved approximately $10,000 in fuel in six months. What's more, maintenance costs are staying at a low level even when gas is used.

As a result of these substantial savings, this Superior owner ordered another Model 80 Superior Diesel. This engine is also capable of developing 1440 HP with 1000 KW capacity at 360 RPM on *either* oil or gas.

It's easy to switch from oil to gas or from gas to oil with a Superior. It can be done instantly . . . with a flick of a finger . . . all the operator has to do is push a button.

Our representative can give you all the operating details on this and other successful Superior installations. Chances are he can help you accomplish the same results. Just write and tell us when he should call or, if you prefer, send for our fully illustrated booklet.

THE NATIONAL SUPPLY COMPANY
SUPERIOR ENGINE DIVISION
Plant and General Sales Office: Springfield, Ohio

THE NATIONAL SUPPLY COMPANY NSCO

Superior DIESELS

Locomotive · Marine · Oil Field · Stationary

smallest, lightest Capacitor on the market

To meet the demands of operators and linemen General Electric especially designed and introduced the 25-kvar capacitor. Every ounce is a working ounce—there is no *waste* space.

Its light weight and small size make it easier to handle and install—permit more units to be installed without increasing pole weight—allow greater clearances for safety factors in crowded locations.

It takes know-how to make good things come in small packages. That's why the 25-kvar capacitor is so small, per kilovar. There's 50 years of know-how behind it.

Outstanding in service, performance and user satisfaction, it saves you money in space and weight. Buy the best. Specify G.E.'s 25-kvar capacitor. *Apparatus Dept., General Electric Company, Schenectady 5, N. Y.*

GENERAL ELECTRIC

Why Not Shock Yourself?

● If you're like most engineers responsible for the operation of transmission lines, you've probably largely lost track in recent years of insulator performance records. It seems rather popular these days to assume that high-voltage insulators are generally "All right." So usually there's a rude shock waiting for any engineer or executive who goes to the trouble of actually finding out what the annual cost for transmission insulator maintenance in his company really adds up to. Those costs do go on, because there's little about conventional transmission insulators today that make them much better than they were 20 years ago, when practically all companies kept a sharp eye on maintenance costs.

But there's one notable exception to all this. The Lapp Line Post. This advanced insulator design now has a 19-year service record. On line after line, all across the country, it has proved its ability to cut insulator maintenance cost to a tiny fraction of that run up by pin-type insulators.

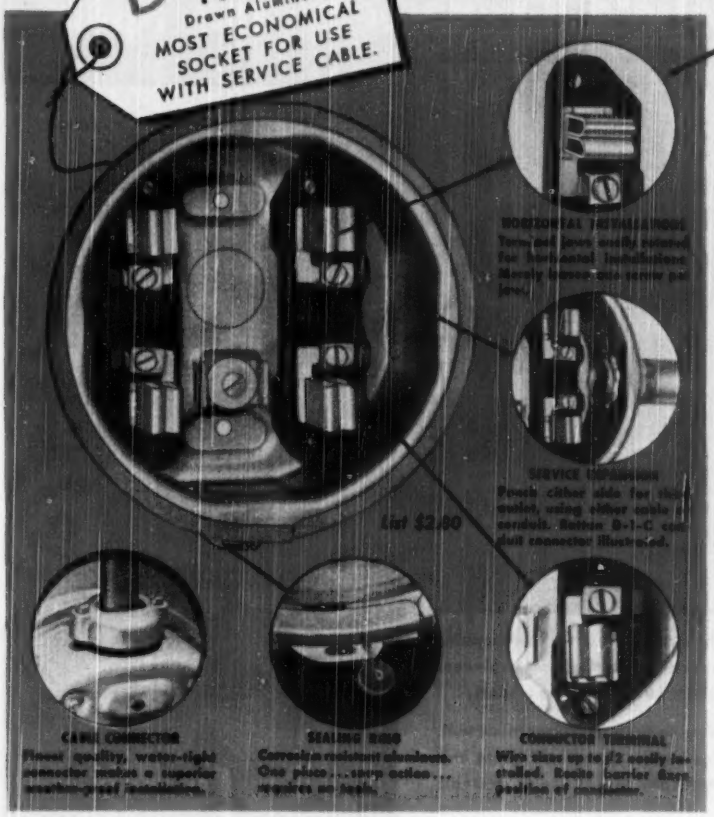
A careful analysis of your own service records will show you the facts. Isn't it worth it for the thousands of dollars per year you stand to save by standardizing on Lapp Line Posts?

Lapp

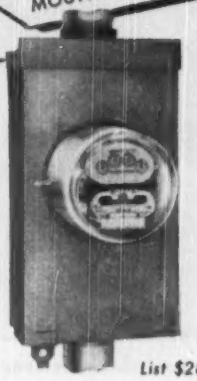
LAPP INSULATOR COMPANY INC., LEROY, NEW YORK

Study Your INSTALLATION ECONOMY

DUNCAN
TYPE D
Drawn Aluminum
MOST ECONOMICAL SOCKET FOR USE WITH SERVICE CABLE.



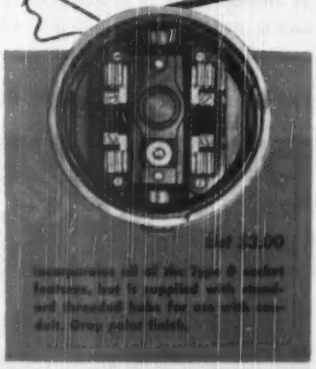
DUNCAN
TYPE H.D.
HEAVY DUTY METER MOUNTING DEVICE



List $28.00

200 amperes of service capacity with self-contained socket type meters.

DUNCAN
TYPE C
Die Cast Aluminum
THE SOCKET FOR CONDUIT



DUNCAN Meter Sockets and Heavy Duty Devices have been designed to provide the most economical meter installation for all types and capacities of services. The Type D socket is particularly applicable in areas using principally service cable — and may be used on any conduit installation. The Type C socket is particularly applicable in areas using principally conduit and may be used on any cable installation. Where service capacities range between 100 and 200 amperes, the Duncan Heavy Duty Meter Mounting Device permits the use of self-contained meters, thus eliminating the additional cost of current transformers.

DUNCAN ELECTRIC MFG. CO.

makers of meters for nearly forty years

DUNCAN

LAFAYETTE **INDIANA**

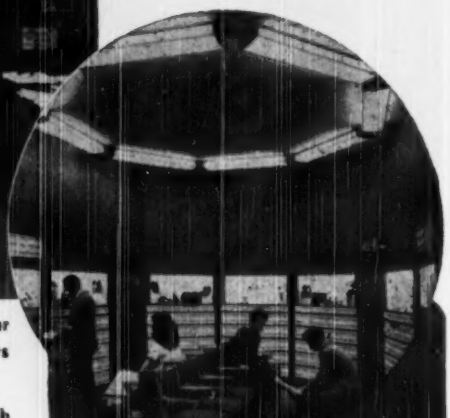
Doing A Store Up *Bright*

With Wakefield Grenadiers and Spots

The Store: ESSERMAN'S Specialty Shop, Rome, Ga.

The Architects: POUNDSTONE, AYERS & GODWIN, Atlanta, Ga.

The Lighting Engineers: GEORGIA POWER COMPANY



When an extensive remodeling job was planned for this popular 53-year old Georgia store, the architects and the lighting engineers chose Wakefield Grenadier fluorescent Luminaires and Spots.

Result: a comfortable yet stimulating shopping environment with general illumination of about 50 footcandles; and with glare and brightness contrasts at a minimum despite lavish use of strategic spotlighting.

A shielded, louvered fluorescent luminaire with metal-framed plastic side panels, the Grenadier provides a highly efficient type of diffused light. It is designed to take 40 W or Slimline lamps, and is also available equipped with a single or double spotlight assembly permitting a 35° adjustment in any direction.

THE F. W. WAKEFIELD BRASS COMPANY • VERMILION, OHIO

All Three { *ARCHITECTS* *ENGINEERS* *CONTRACTORS*

favor Wakefield Grenadiers for Store Lighting because

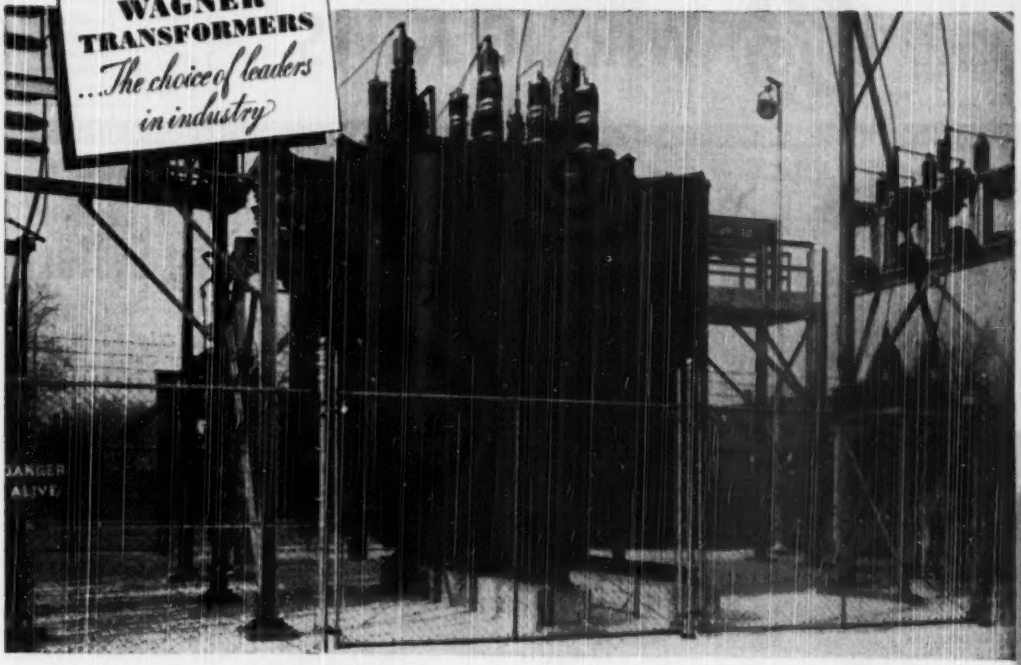
1. efficient type of diffused lighting
2. combination of general and spot lighting in one fixture
3. easy, quick installing; one man can do it
4. easily maintained; can be re-lamped through side or bottom and top when suspended
5. certified ballasts
6. Underwriters approved
7. fully guaranteed

Wakefield

Over-ALL Lighting

FOR SCHOOLS • OFFICES • STORES

WAGNER TRANSFORMERS
...The choice of leaders in industry



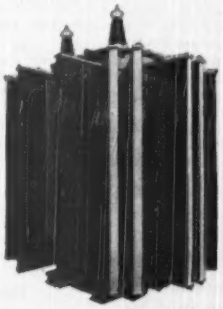
Wagner Transformers provide Carnegie-Illinois Steel dependable distribution of power to *"keep 'em rolling"*

When you think of the Carnegie-Illinois Steel Corporation, you may have a mental picture of the greatness of American industry. It *is* great—a modern goliath of industrial production—rolling out the steel that is the sinew of all industry. And its greatness is in *production.*

Production is a word with which Wagner Transformers like to be associated. Hundreds and hundreds of Wagner power transformers, of all types and sizes are distributing power to industrial plants throughout the country. In every case they are adding to their reputation for complete dependability . . . for unfailing service . . . that prompted Carnegie-Illinois to install Wagner Transformers.

Wagner engineers are qualified to specify the correct transformer for *your* requirements. Nationwide service facilities are available to users of Wagner Transformers. Consult the nearest of our 31 branch offices or write us.

Shown below is a Wagner 16,667 kva Power Transformer. Single phase, 60 cycle, 72,000 to 6,600 volts. This transformer was adapted to the special needs of the Carnegie-Illinois application. Wagner engineers can suit your special requirements as well.



WAGNER ELECTRIC CORPORATION
6456 Plymouth Ave., St. Louis 14, Mo., U.S.A.

Wagner Electric Corporation
EST. 1891

ELECTRIC MOTORS • TRANSFORMERS • INDUSTRIAL BRAKES
AUTOMOTIVE BRAKE SYSTEMS — AIR AND HYDRAULIC

BRANCHES IN 31 PRINCIPAL CITIES

WIRING NEWS

Hint for power salesmen
Practical tip for installation, maintenance, and operation personnel

A PERIODICAL DIGEST OF WIRING IDEAS FROM THE GENERAL ELECTRIC CONSTRUCTION MATERIALS DEPARTMENT

Enlarged section of special, untreated cotton cloth used in the manufacture of G-E No. 1799 varnished-cambric insulation for G-E power cables. Note large holes that assure maximum varnish absorption.

Quality Insulation Begins with the Cloth!

That's right, in the manufacture of General Electric No. 1799 varnished-cambric insulation for G-E power cables, only a selected, untreated cotton cloth is used. Woven to exacting General Electric standards, it absorbs and retains a greater amount of our own tough, flexible varnish than ordinary cloth. The result — after carefully controlled baking processes — is an insulation high in dielectric strength, stubbornly resistant to extremes of operating temperature, and uniform in thickness and strength.

Even though subjected to continued high conductor temperatures, General Electric varnished-cambric remains completely pliable.

In one test, a cable insulated with No. 1799 varnished-cambric, after more than 400 hours in an oven at 125 C, is bent around a ½"-diameter mandrel without damage to the insulation.

G-E varnished-cambric cables are available in three basic types:

BRAIDED — for power and control circuits, exposed or installed in conduit in dry locations; and for transformer and apparatus power leads.

INTERLOCKED-ARMOR — for overhead distribution in power plants and factories. This cable requires no raceways, permits speedy installations.

LEADED — for generator leads and power wiring in conduit or in underground ducts.

For information on any type in the complete line of G-E varnished-cambric cables, check box (A) in coupon.

Four G-E Products Improve Plant and Residential Wiring Systems

New Switch Box Has Five Big Features

Featuring a redesigned side-plate locking arrangement, this new General Electric switch box simplifies both the installation and ganging of boxes on any job.

New side-plate wedging action locks side-plates securely in position. Box sides cannot be dislodged by hammer blows while the box is being mounted or during scribing for lath cut-outs.

In addition to side-plate nail holes for easy gang mounting, a set of nail-through holes allows speedy mounting of *entire box* direct to studding. Merely drive home two 10d nails and you're ready to wire. There's no disassembly of side sections . . . no interference with knockouts . . . no clearance problems on any standard device.

Four contact points instead of three eliminate rocking or tilting of box during installation. Special side pry-outs provide for out-of-the-ordinary installations. All pry-outs are easily removable with a simple twist of a screwdriver blade.

A new single-screw ear for faster adjustments provides an added feature. A heavier b idge across ears gives increased support.

The new General Electric switch boxes are easily gangable and may be used with old type boxes on new construction or on modernization jobs. Get complete information on *all* their time-saving features—just check box (B) in coupon.

G-E Devices Keep Pace With Increased Loads

General Electric offers you up-to-the-minute wiring devices for circuits that supply current to motors, appliances, and motor-driven tools.

Heavy-Duty Switches

Smooth, reliable control of 125- or 250-volt circuits presents no problems when you use the new General Electric heavy-duty switch. Designed for 20- and 30-ampere operation, these T-rated, specification-grade units offer new improvements for faster, easier installations.

The switch is completely enclosed in a plastic housing for total protection from foreign particles during installation operations and is of shallow construction to provide ample wiring space in standard switch boxes.

Back-wired pressure terminals on the switch eliminate necessity of looping wires. Wires go in straight and are held firmly in place by pressure connectors.

For further information on General Electric's complete line of long-lived, heavy-duty switches, check box (D).

New Grounding Outlets

New grounding outlets and plugs meet the need for devices to conform to NEC or other applicable codes requiring grounding of portable electrical equipment. The outlet will accommodate any two-prong standard parallel-blade plug cap and will also take the special three-pole grounding cap. It is back-wired for easy installation and has two grounding terminals so that ground wires may be carried easily from one outlet to another. Pressure terminals accommodate two wires for easy wiring. In addition, ground contacts are also connected to washer-type plaster ears. Check box (C) for further information.

Quick-change Fuses

You'll find General Electric time-delay fuses are real time savers. Available in both ferrule and knife-blade types, they are easily renewable. Simply unscrew cap . . . insert new, self-aligning link . . . and replace cap. G-E time-delay fuses give quick positive protection against dangerous overloads — yet limited transient overloads won't cause unnecessary "blows". Check box (E) for information.

Section K10-727

Construction Materials Department, General Electric Company, Bridgeport 2, Connecticut

- ☐ A—Varnished-cambric Cables
- ☐ B—New Switch Box
- ☐ C—New Grounding Outlet
- ☐ D—Heavy-duty Switches
- ☐ E—Time-delay Fuses

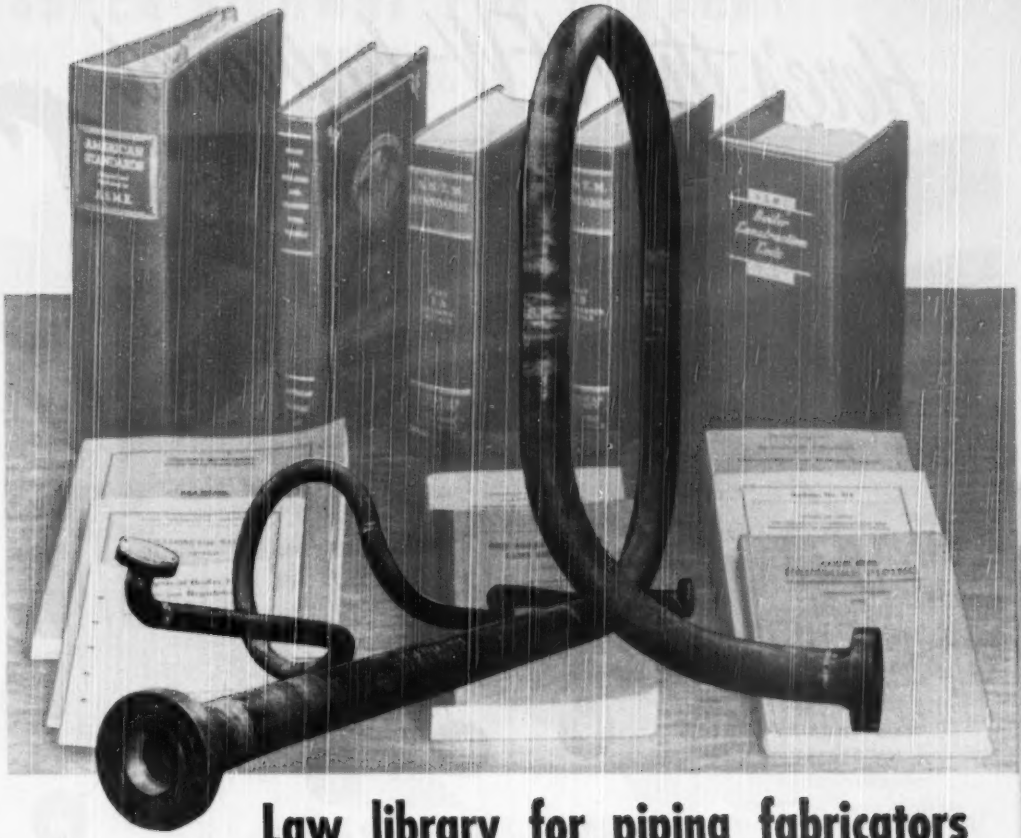
Name _____ Title _____

Company _____

Address _____

City _____ Zone _____ State _____

GENERAL ELECTRIC



Law library for piping fabricators

THE safety of your employees, the welfare of the community and a major investment can depend on a single piece of prefabricated piping. That's what piping codes are for . . . state, national, association and insurance codes. You don't have to know these codes because Grinnell engineers know the "law" intimately, check and cross-check with these codes at every step from preparation of detailed drawings and specifications right through bending, welding, stress relieving, heat treating, testing, final inspection, assembly and test runs.

That's just one of the many advantages of having a piping system prefabricated by Grinnell.

The complete "package" includes interpretative engineering, metallurgical research, compliance with code requirements, manufacturing drawings and specifications, production schedules, purchase of materials, specialized facilities, skilled personnel, control of quality and rigid inspection.

You get this complete package from a Grinnell prefabricated piping plant on schedule, ready for field erection, meeting all code requirements and at a real economy.

GRINNELL

Grinnell Company, Inc., Providence 1, R.I. Warehouses: Atlanta • Buffalo • Charlotte • Chicago • Cleveland • Cranston • Fresno • Kansas City • Houston • Long Beach Los Angeles • Milwaukee • Minneapolis • New York • Oakland • Philadelphia • Pocatello • Sacramento • St. Louis • St. Paul • San Francisco • Seattle • Spokane

Here's the NEW-Improved

New VARSITY NV SERIES

SPECIFICATIONS

Sturdy, 20 gauge steel, finished in white, high-reflection baked enamel with satin finish aluminum-grey trim. Side panels of extruded plastic. Moulded one-piece plastic "egg-crate" louver gives 40° x 40° shielding . . . louver hinged to swing from either side for easy relamping. Can be installed singly or in continuous runs. No couplers needed! . . . Slimline models feature instant-start 120, 200, 300 or 425 milli-ampere operation. Conventional 110-125 volts, 60 cycle A.C., with other voltages available.

CONSULT OUR CUSTOM-SERVICE DEPARTMENT

if you have special requirements. We will design and build lighting fixtures to your order.

A Luxury Fixture at a Budget Price!

Now the VARSITY edges into the luxury group. Yet it still is in the popular-price class. Using tubes from 48" to 96" long, this fluorescent fixture illuminates large areas at low fixture-cost and low operating cost!

LOOK AT ALL ITS FEATURES

1 Aligned coupling-holes
2 Optional reflector for increased downlight
3 Knockouts provided for completely flexible mounting arrangements.
4 Ribbed translucent curved-plastic side panels.
5 Upward light spill gives 40% indirect illumination
6 Hinged louver to swing from either side for easy relamping and servicing.
7 2, 3 or 4 40-watt tubes or Slimline tubes 48" to 96"
8 Injection-moulded plastic louver with 40° x 40° shielding angle
9 High reflection baked-enamel reflector
10 No couplers required for continuous row installation

Sold and installed only by the better electrical wholesalers and contractors

Leader *America's No. 1 Lighting Equipment Manufacturer*

LEADER ELECTRIC COMPANY • 3500 NORTH KEDZIE AVENUE • CHICAGO 18, ILLINOIS
Leader Electric—Western • 800 One Hundredth Avenue • Oakland 2, California
Campbell-Leader, Ltd. • Brantford, Ontario, Canada

A SUPER-HIGHWAY FOR CURRENT

NO EXPOSED CONTACTS at hinge . .

with SPHC*

Above is the complete 34.5 Kv., 600 Ampere switch. At top—enlarged portion of hinge and blade mechanism.

*Sealed Pressure Hinge Contact

This new Sealed Pressure Hinge Contact development is truly an ingenious feature at this very critical point. Current flow is unhindered by exposed joints or break contacts.

Completely enclosed and weather-sealed, Hi-Pressure, Hi-Thermal capacity, silver to copper contact is a super-highway for current. Continuous, annular, constant electrical and mechanical contact at all times —entirely eliminates any second break contact. Current carried through BOTH hinges.

Only one "break" contact is necessary on a switch. Why have more than one—which creates another critical point?

✓ CHECK these extra FACTS

1. **JAW CONTACT**—Hi-Pressure, Hi-Thermal capacity silver-to-copper. The ONLY "break" contact on the switch.
2. **BLADE MECHANISM**—Simple, harmonic, self-locking, accurately controlled blade motion.
3. **BLADE**—One-piece, hard drawn copper.
4. **TERMINALS**—Four-bolt, equal height from base.
5. **BEARING**—Greaseless, weather-sealed, stainless ball bearing.

I-T-E R&IE

RAILWAY and INDUSTRIAL ENGINEERING CO., GREENSBURG, PA.

IN CANADA: EASTERN POWER DEVICES LIMITED, TORONTO

An I-T-E ORGANIZATION

CONDUCTOR SUPPORTS
CLAMPS AND FITTINGS

DISCONNECTING SWITCHES
INDOOR AND OUTDOOR

HORN GAP SWITCHES

INTERRUPTER SWITCHES

CUTOUTS AND
THERMO-RUPTERS

DISTRIBUTION
EQUIPMENT

SWITCH OPERATING
MECHANISMS

SUBSTATIONS

OPEN OR ENCLOSED
ISOLATED PHASE
HEAVY DUTY BUSES

KIRK INTERLOCK
SYSTEMS

AUTOMATIC
SWITCHING
EQUIPMENT

METAL CUBICLES

TESTING DEVICES

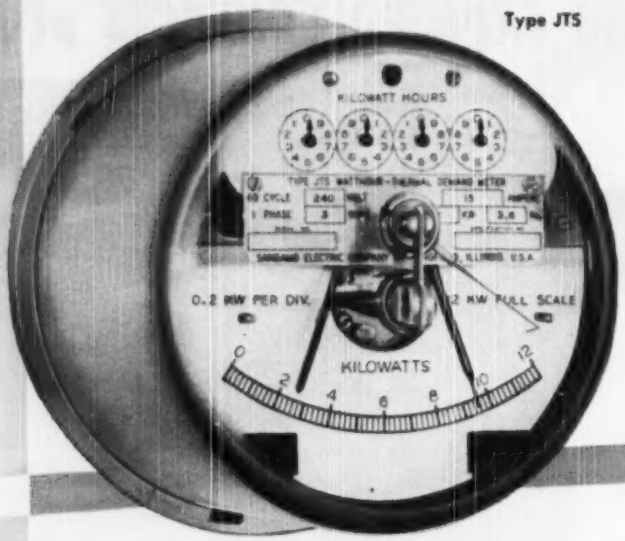
Smaller Size for Convenient Installation

in minimum space

New Sangamo Type JT

Combination Watthour-Thermal Demand Meters

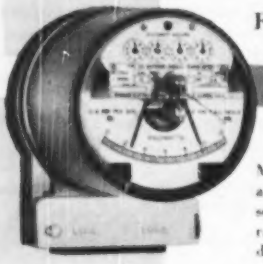
Type JTS



In the new Type JT meter line, Sangamo has combined two *completely independent* elements in a single meter case that requires only the space normally provided for conventional watthour-demand meter installations. Sangamo Type JTA and Type JTS Combination Watthour-Thermal Demand Meters are designed for convenient demand measurements on all types of single-phase loads.

The watthour meter element in the new line incorporates all the service proven features of the standard Sangamo Type J Meter. The thermal meter element design is the result of many years of experience with Lincoln Thermal Demand Meters. These two elements operate completely independently of each other.

For full information, write for Bulletin 431.

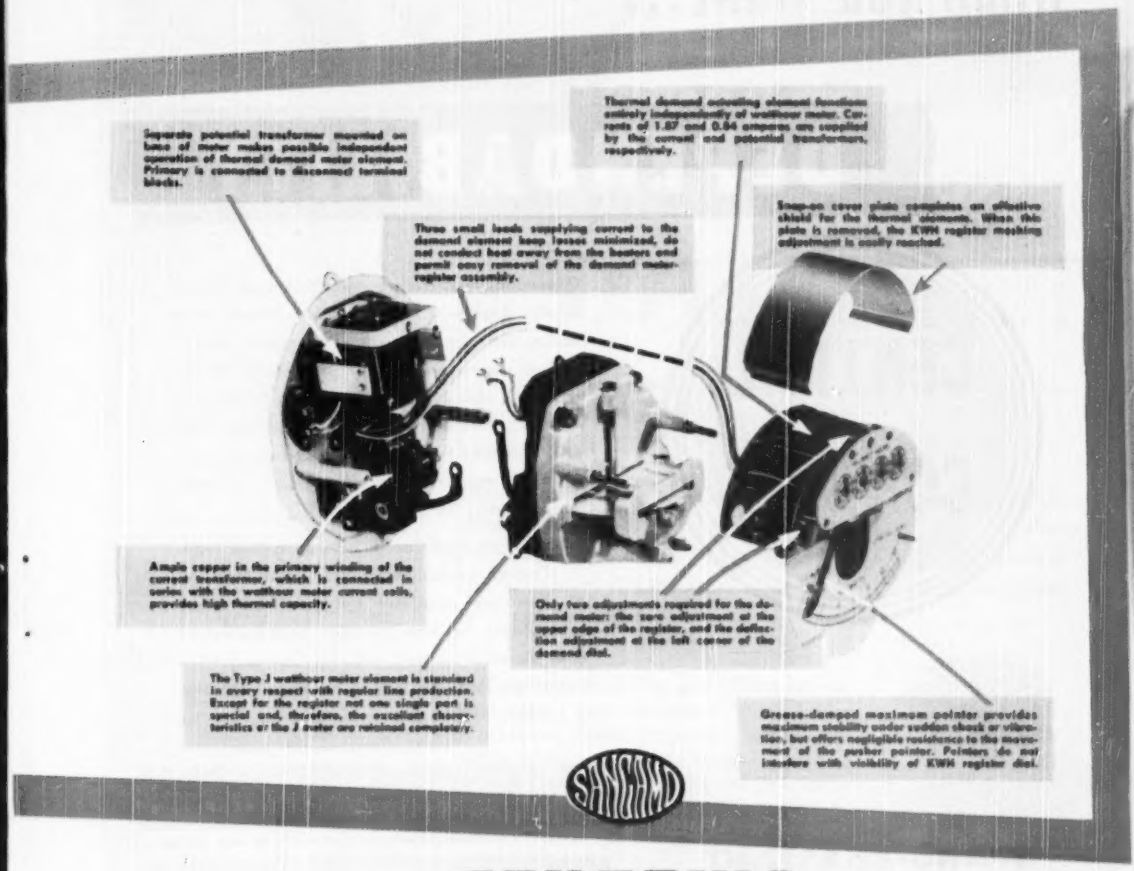


Type JTA

Meter capacities for normal loads not requiring C.T.'s are 15 ampere with full scale demand of 12 KW, and 50 ampere with full scale demand of 24 KW. Full scale demand is 48 KW on meters rated 50 amperes for use with heavy duty sockets. Full scale demand is based on 240 volts. Standard capacities are available for use with current transformers.

DESIGN FEATURES

- The operation of the Type J and Lincoln meter elements are completely independent.
- Established characteristics of both the watthour meter and the demand meter are not affected through the combination of the two functions.
- Losses in leads and heaters of the thermal elements are exceptionally low because of the small current (1.8 amperes) required for full scale indication.
- Thermal element is completely shielded against external heating effects or temperature gradients within the meter.
- Frictionless, grease damped, maximum demand pointer, stabilized against motion from vibration or shock.
- Independent construction, the use of a standard J watthour meter element, and complete accessibility of all parts, including adjustments, minimizes maintenance costs.


Separate potential transformer mounted on base of meter makes possible independent operation of thermal demand meter element. Primary is connected to disconnect terminal blocks.
Thermal demand actuating element functions entirely independently of watthour meter. Currents of 1.87 and 0.64 amperes are supplied by the current and potential transformers, respectively.
Three small leads supplying current to the demand element keep losses minimized, do not conduct heat away from the heaters and permit easy removal of the demand meter-register assembly.
Snap-on cover plate completes an effective shield for the thermal elements. When this plate is removed, the KWH register marking adjustment is easily reached.
Ample copper in the primary winding of the current transformer, which is connected in series with the watthour meter current coils, provides high thermal capacity.
Only two adjustments required for the demand meter: the zero adjustment at the upper edge of the register, and the deflection adjustment at the left corner of the demand dial.
The Type J watthour meter element is standard in every respect with regular line production. Except for the register not one single part is special and, therefore, the excellent characteristics of the J meter are retained completely.
Grease-damped maximum pointer provides maximum stability under sudden shock or vibration, but offers negligible resistance to the movement of the pusher pointer. Pointers do not interfere with visibility of KWH register dial.

SANGAMO

SANGAMO
ELECTRIC COMPANY
SPRINGFIELD, ILLINOIS

Call your CENTRAL CONDUIT DISTRIBUTOR when you want...

DEPENDABILITY

CENTRAL SPANG CONDUIT

Dependability is the watchword of your Central Conduit Distributor. He maintains a smooth functioning team to provide you with top-notch service. And he makes sure that the products he has for sale are equally dependable. That's why he handles and recommends Central Rigid Steel Conduit. He knows that every length measures up to the rigid standards that have made the name Spang famous for quality.

Central Rigid Steel Conduit is made in three types . . . Cenlaco, Central White and Central Black. All of them are approved by the Underwriters' Laboratories, Inc. Next time you need Conduit or other electrical supplies, call your Central Conduit Distributor. That's the way to be sure of the best in products and the best in service.

SPANG-CHALFANT
Division of The National Supply Company
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CENLACO a hot dipped galvanized and lacquered finish, inside and out.

CENTRAL WHITE electro-galvanized outside and black enameled inside.

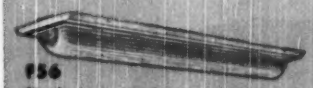
CENTRAL BLACK permanent, baked-on black enamel finish, inside and out.

F40

Joleco's new Recessed Fixture for fine store and office lighting . . . available in 2 or 4 lamps with shielding of either Aluminum Louver, Inverted Flush Aluminum Louver, Corning "Albo-lite" Glass, Corning "Fresnel" Lens or Formed "Plexiglas".

F30

A surface or suspension mounted fixture designed as a companion to F40 . . . available in 2 or 4 lamps with shielding of either Aluminum Louver, Inverted Flush Aluminum Louver, Corning "Albo-lite" Glass, Corning "Fresnel" Lens or Formed "Plexiglas".



F56

Single-lamp, surface or suspension mounted fixture . . . ideal for corridors, lobbies, meeting rooms, dining rooms, cafeterias and similar installations . . . streamlined, plastic shield of pleasing appearance, non-breakable, shatter-proof and light in weight.

F510

Four-lamp, surface mounted shielded unit for store lighting . . . Corning "Albo-lite" glass shielding produces shadowless illumination and excellent distribution of light on shelves and displays . . . easily and inexpensively maintained.

F60

Surface or suspension mounted luminaire for factories, warehouses, drafting rooms, laboratories . . . available in 1, 2 or 4 lamps . . . economical in first cost, installation and upkeep.

All of the Joleco fixtures shown can be installed as individual units, in patterns or in continuous rows. They are available for use with pre-heat or instant start fluorescent and 4 foot or 8 foot lengths.

ILLUMINATION

Illumineering®

ENGINEERING

THE RESULT OF

Progressive Design

by JOLECO . . . .

Out of our program of continuing research in lighting has come a new concept which we choose to call *Illumineering*—a composite of ILLUMINATION and ENGINEERING.

This *Illumineering* approach "remembers" lighting requirements, efficiency factors, design and appearance, plus installation, maintenance and inspection features. All of these are built into every JOLECO luminaire to insure complete approval by buyer and seller.

We are now compiling our "Illumineering Data Book." Basic *Illumineering* and fixture data is ready. Continuing studies and features will be added as completed. Be sure your name is on the mailing list for this valuable information. Write today.

JOLECO Corporation

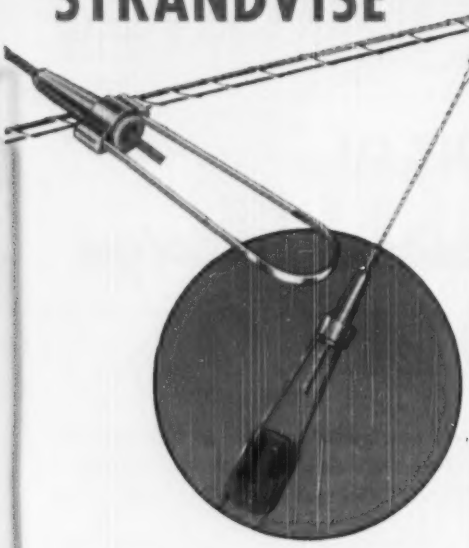
Designers and Manufacturers of LIGHTING FIXTURES

2519 BALDWIN STREET **ST. LOUIS 6, MO.**

NOW YOU CAN SPLICE OR DEADEND STEEL STRAND IN SECONDS

TWO NEW Reliable CONSTRUCTION SPECIALTIES

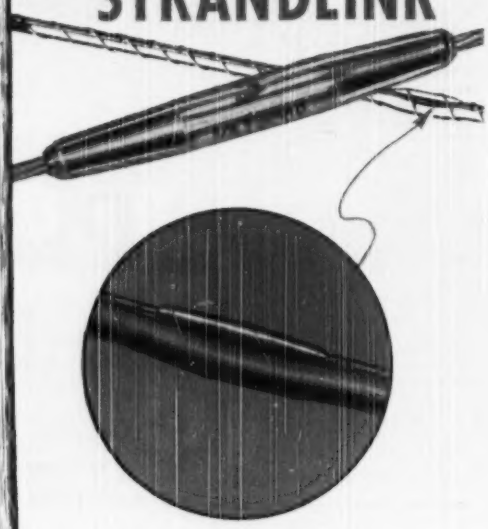
STRANDVISE



Reliable's two great new construction specialties, STRANDVISE and STRANDLINK, will cut installation time by 90% — save you money in many ways — simplify one of your major operations. STRANDLINK splices messenger wire in seconds, eliminating removal of the lashing machine as with old fashioned nuts, bolts, hardware and johnny balls.

In STRANDVISE and STRANDLINK, Reliable takes the industry's first significant step toward greater installation and relocation economy in a half-century. Investigate these new, modern units yourself. Send for free samples *today*.

STRANDLINK



Jaws on Reliable's new STRANDVISE and STRANDLINK grip surely, will not slip. Hundreds of case-hardened Zinolite-plated steel teeth do the gripping — grip sharply, yet without gashing. Heat treated aluminum cartridges, alloy yokes, and stainless steel bails have strength factors far beyond that of the strand. Assembly is factory treated with corrosion-resistant lubricant. No installing tools needed.

Reliable ELECTRIC COMPANY

3145 CARROLL AVENUE, CHICAGO 12, ILLINOIS

OVER 40 YEARS OF SERVICE TO THE UTILITIES

POWER-LINE CONNECTORS AND CONSTRUCTION SPECIALTIES

Micah is a "man of action"— a dynamic character — knock the "h" out of him and you have just mica. Keep the "h" in and you have the symbol of a specific kind of mica — MACALLEN MICA — the best performer in the insulation field.

when you think of MICA, think of MACALLEN

MACALLEN MICA

ALL FORMS, ALL QUANTITIES — ALL DEPENDABLE

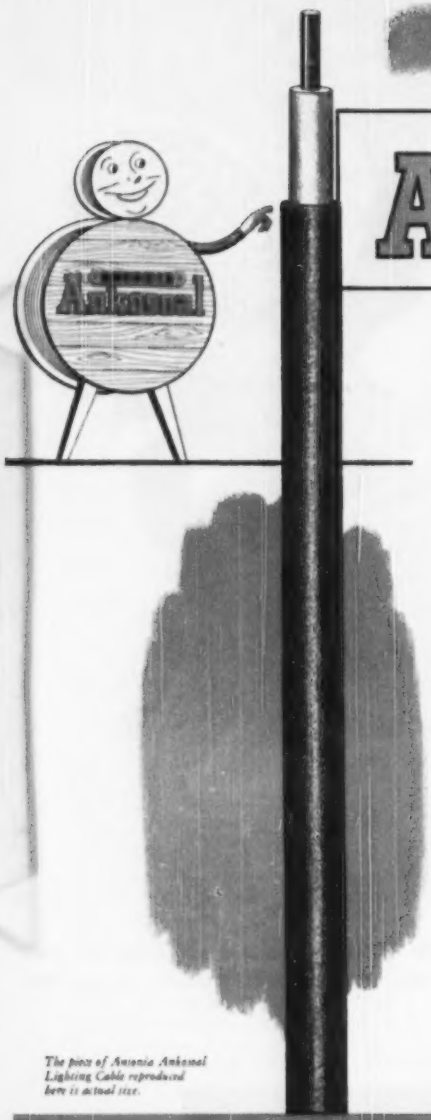
THE MACALLEN COMPANY 16 MACALLEN STREET • BOSTON 27, MASS.
CHICAGO: 565 W. WASHINGTON BLVD. • CLEVELAND: 1231 SUPERIOR AVE.

Street Lighting Engineers

are turning to

ANSONIA Ankoseal®

for Lighting Cable



The post of Ansonia Ankoseal Lighting Cable reproduced here is actual size.

This modern, all-plastic cable is replacing other types of cable that were considered satisfactory previously.

One big reason for this changeover is the much lighter weight of Ankoseal Lighting Cable. This results in savings of effort at every point of handling from initial delivery to final installation.

A second advantage is the exceptional inertness of Ankoseal cable *all the way through* to earth acids, duct water, oils and other contaminations which eventually cause cable replacement.

A third advantage is its complete resistance to corona cutting or cracking.

With this combination of advantages, light weight and longer service life, there is great potential economy that deserves the investigation of every Street Lighting Engineer.

Ankoseal Lighting Cable is available for every street lighting use. It can be supplied shielded or unshielded according to your specifications.

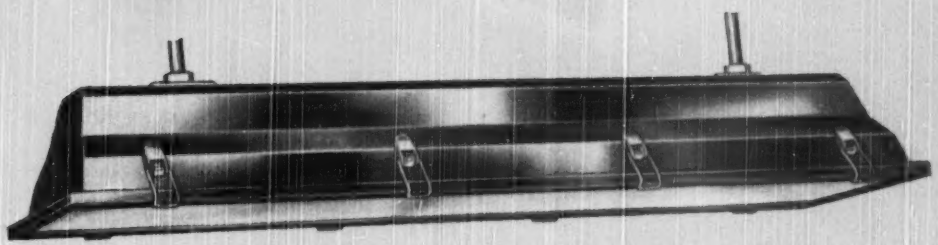
Additional information will gladly be sent upon request.

THE ANSONIA ELECTRICAL COMPANY

SUBSIDIARY OF NOMA ELECTRIC CORPORATION

ANSONIA, CONNECTICUT

HELP! ...Yourself to greater Lighting Efficiency



Wheeler GLASS-ENCLOSED FLUORESCENT FIXTURES

FOR SEVERE SERVICE CONDITIONS

DUST-TIGHT
FOR HAZARDOUS LOCATIONS

Designed for use wherever combustible dust atmospheres exist, such as those containing flour, starch, grain dusts, carbon black, coal dust, or easily ignitable fibres or flyings.

VAPOR-TIGHT
FOR NON-HAZARDOUS LOCATIONS

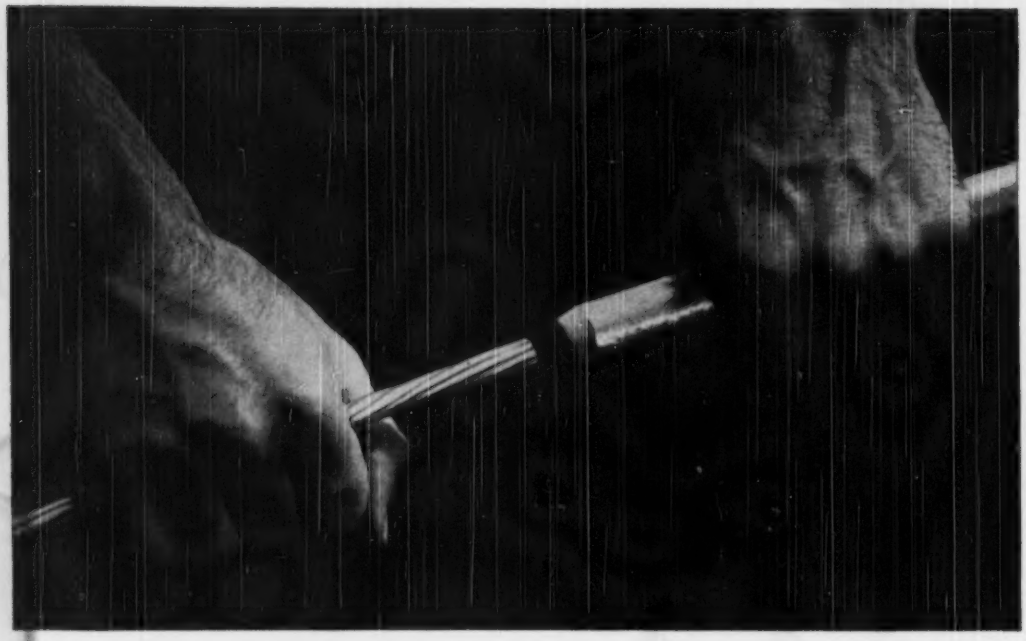
The ideal unit for use in food plants, printing establishments, and wherever non-combustible atmospheres exist. Its efficiency soundly proved in actual operation. Easily installed, economically maintained!

For complete information write Wheeler Reflector Co., 275 Congress Street, Boston 10, Massachusetts

Wheeler **REFLECTORS**

Distributed Exclusively Through Electrical Wholesalers

MADE BY SPECIALISTS IN "SKILLED LIGHTING" EQUIPMENT SINCE 1881



No need to seize this strand ...just cut and insert

One of the many fine features of Bethlehem Form-Set strand is its ease of handling in the field.

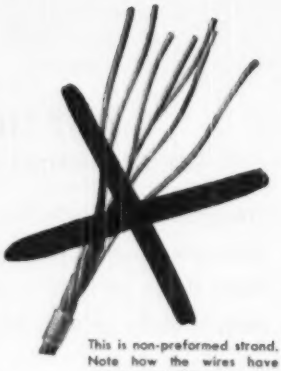
A typical example is shown in the illustration above. Here, a length of unseized Form-Set strand is about to be inserted into a fitting. It will go easily and without fuss . . . because the wires of the strand, being preformed, cannot unravel or bush out; cannot create a log-jam at the front end of the fitting.

Preforming, which greatly reduces inner tension, is the big difference between Form-Set and ordinary strand. Each individual wire is given its permanent shape before being laid in the strand; hence the wires have no urge to uncurl or spring apart, even when cut.

Does Form-Set cost more than conventional strand? Very *little* more; the extra cost is so small as to be negligible. And this trifling extra charge is soon offset by the easier handling and time saved in the field.

All Form-Set strand is armored against corrosion by the protective bethanized coating—a jacket of highly-pure zinc that is available in three different thicknesses. Thus it is possible to select the coating-weight that best meets conditions in any given locality.

Further information in full detail will be furnished upon request.



This is non-preformed strand. Note how the wires have sprung apart after cutting. You don't get this condition with Bethlehem Form-Set strand.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation.
Export Distributor: Bethlehem Steel Export Corporation

Bethlehem *FORM-SET* Strand

BETHLEHEM STEEL

PLEXIGLAS *diffusing panels in control room of Philadelphia Electric Company generating station. Large sections of white translucent* PLEXIGLAS, *installed below cold cathode tubes, give excellent glare-free illumination.*

A Lighting Fixture as Big as the Room

IT'S PLEXIGLAS

Here's the newest thing in large-area lighting—*pure illumination without glare or shadows*—diffused by large PLEXIGLAS plastic panels, installed wall-to-wall. And here's safety overhead, because PLEXIGLAS is light, strong, shatter-resistant.

Actually, white translucent PLEXIGLAS diffuses light so completely that shadows and glare simply vanish. Minimum absorption and maximum transmission of light give full, even illumination throughout any room. Brightness ratios are remarkably low.

PLEXIGLAS ¼" thick has seven times the impact strength of glass—yet weighs less than half as much. Light weight and shatter resistance permit its use in large sections with complete safety and ease, and economy of installation. Maintenance costs are negligible.

You'll find PLEXIGLAS wall-to-wall diffusing panels in banks, drafting rooms, stores, classrooms and control rooms—wherever *glare-free* lighting is desired, and safety with savings is essential. Tell us about *your* lighting problem. We'll be glad to send you full information regarding *modern* lighting with PLEXIGLAS.

PLEXIGLAS *is a trade-mark, Reg. U.S. Pat. Off. and in principal foreign countries.*

Canadian Distributor: Crystal Glass & Plastics, Ltd., Toronto, Ontario, Canada

CHEMICALS FOR INDUSTRY

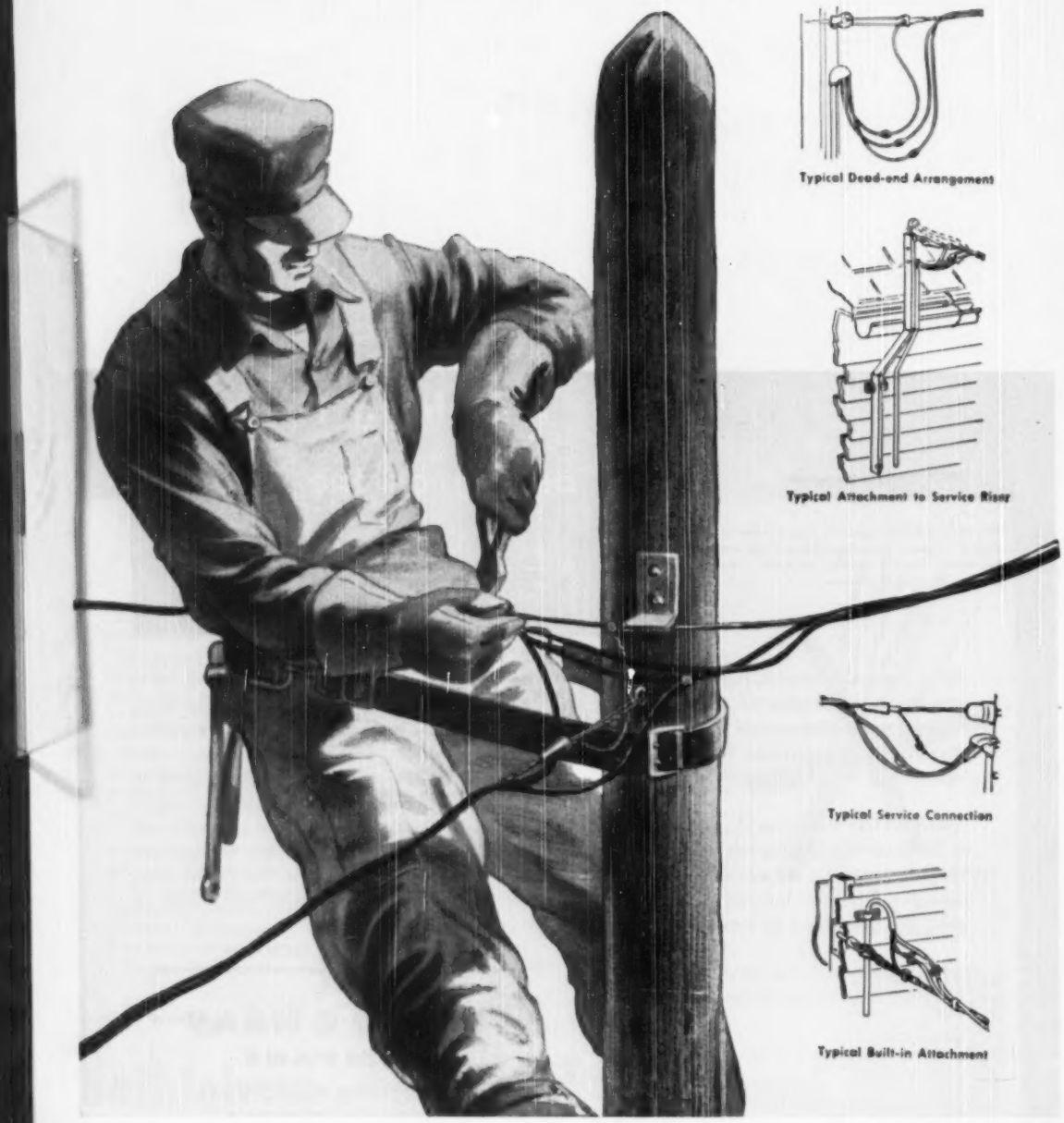
ROHM & HAAS COMPANY

WASHINGTON SQUARE, PHILADELPHIA 5, PA.

Representatives in principal foreign countries

When Rome Self-supporting Service Cable goes up... your costs go down!

Insulated with RoPrene (Neoprene) or RoLene (Polyethylene)



Typical Dead-end Arrangement

Typical Attachment to Service Riser

Typical Service Connection

Typical Built-in Attachment

Small wonder more and more electric utilities are specifying Rome Self-Supporting Secondary and Service Drop Cable. Its simplicity of construction, its lower cost (up to 25 per cent), compared with conventional Service Drop (Type SD) Cable, will save you money.

HERE'S WHY...

- Ease and economy of installation with less labor and cheaper hardware
- Eliminates crossarms and permits shorter poles
- Longer life in all weather because of its all-resistant Neoprene or polyethylene insulation . . . no braids to rot or festoon
- Less tree trimming because of its high resistance to abrasion
- Conductor accessibility with no common covering to remove
- Less subject to damage by storm and falling limbs . . . will operate SAFELY even if down
- Better voltage regulation because of lower reactance in long and heavily loaded circuits

A product of Rome Cable engineering, Rome Self-Supporting Secondary and Service Drop Cable is today's answer to high service installation costs. Its advantages have been service proven by leading utilities. Send for Bulletin RS-4 and see for yourself why it is the accepted cable for economical overhead services.

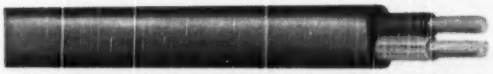
IT COSTS LESS TO BUY THE BEST

Rated at 600 volts with maximum continuous copper temperature of 80° C.

STREET LIGHTING CABLES

RoZone-RoPrene Series Street Lighting—5,000 Volts

RoLene-Rome Synthinol* Series Street Lighting—5,000 Volts



RoLene Ornamental Pole and Bracket Cable—4,000 to 12,000 Open Circuit Voltage

* TRADE MARK REG.

Rome manufactures a wide range of high and low voltage cables for underground or overhead wiring or series and multiple lighting systems.

- RoZone-RoPrene (Neoprene) offers the ultimate in non-metallic sheathed series street lighting cables suitable for direct burial or duct installation.
- RoLene (Polyethylene) insulated types are a new development and offer considerable economic advantages.
- RoLene (Polyethylene) Belted Ornamental Pole and Bracket (Mast Arm) Cable is an up-to-date design featuring improved construction with small diameter and low cost.

ROME CABLE CORPORATION, Dept. EW-7, Rome, N. Y.
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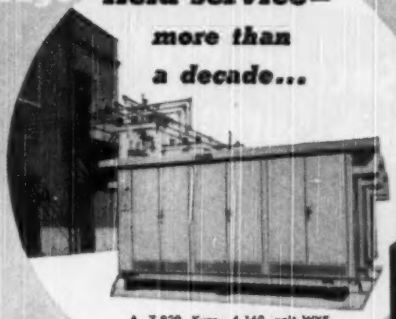

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CHEVROLET

Pole Star Sales are UP

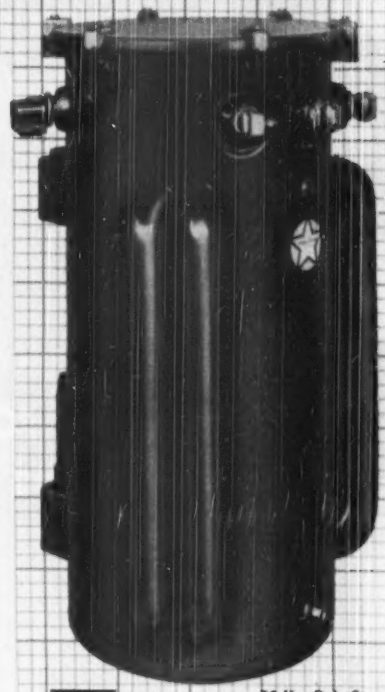
Each month a greater number of Utilities and Industrials are specifying Pole Star transformers. Here are some of the reasons:

THE COIL Coils are wound independently of the core. This permits each coil to be *tightly* wound and *individually* treated for great mechanical strength. If necessary, the coil can be removed from the core and easily replaced *in the field* without appreciably changing the core loss or exciting current of the core.

THE CORE *Low Exciting Current* is one of the outstanding features of the Pole Star core. Laminations of the cold rolled oriented steel core are *individually lapped.* The large cross section area at the lap reduces the density and prevents a concentration of flux. The lapped construction also results in a quiet core — *the noise level is fixed* at a low value.

THE TANK Three coats of transformer paint are applied and baked onto the tank, only after the surface of the tank is thoroughly *shot blasted.* Hanger lugs are hand welded to the tank with a complete bead weld *to prevent* any water from lodging beneath the hanger brackets. Tanks are sealed with synthetic rubber gaskets.

THE BUSHINGS There are no pockets or gooseneck bushings on the Pole Star. All side-issuing bushings, 5 Kv and below, are straight, stud type. Bushings are *lathe-turned* for greatest mechanical strength. Bakelite insulating caps cover the high voltage solderless connectors and swing out of the way when line connections are made. Forged terminal connectors are designed so the lineman *can see the connection* while he is making it.



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Safe Thrifty And Reliable

PERMANENTLY FORTIFIED
for Life-Time Wiring Protection

Unlike ordinary rigid steel conduit, SHERARDUCT is fortified—*permanently fortified*—against rust and corrosion by the Sherardizing Process of dry galvanizing. A pure zinc coating, driven into the pores of the steel, becomes an integral part of the tube itself because it's *alloyed with the steel.* Furthermore, SHERARDUCT will not split or peel, and although it can be bent easily, it will not crack!

SHERARDUCT is still further protected against acids and other corrosive agents by the clear "Shera-Solution" coating, baked on for added endurance. The smooth inside surface makes fishing easy.

Specify SHERARDUCT. It's full weight, threaded, rigid steel conduit—*fortified* to give wires and cables a *life-time of protection.*

Sold through leading electrical wholesalers.
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PRODUCTS CORPORATION

1303 CHAMBER OF COMMERCE BUILDING, PITTSBURGH 19, PA.

Providing for an Emergency

THE FAR EASTERN crisis may superimpose a power demand upon the industry above that now being created by peak business. Such a possibility cannot be ignored by the power producing industry. Previous estimates of requirements for the 1951 peak will have to be reviewed in the light of new circumstances. Materials and supplies may not be adequate for the demands that may be made upon the industry. Certainly this is not the time for hoarding or nervous uncertainty. Control of materials flow will have to be reckoned with. So it is a time for calm consideration of the demands that will be placed upon the electric utilities.

Since 80% of the capacity and practically all of the reserves are in the investor-owned systems, they must carry the major burden.

The Federal Reserve Board's index of industrial production is running at the post-war peak of 1947. Should this level of business be approached in December, the peak demand could exceed previous EEI estimates by more than 2%. It is reliably reported that the stockpile of aluminum is very low. The capacity to produce is well under that of World War II because of obsolescence and retirements. The steel industry is in the process of increasing the use of power for the reduction of iron ore. These are just two instances of potential power demand. When we entered the last war there was a reserve capacity of some ten million kilowatts. The industry is approaching this figure for the winter of 1950. But compared with 1941, the industrial activity is at a peacetime peak. This being true, there is little load that can be added to the electric systems without similar increases at the industrial plant level. Of course increased hours of work and replacement of civilian by military production are two obvious ways to meet military needs without increasing the industrial demand.

As pointed out in the last EEI electric power survey, "New generating capability could be built and interconnecting transmission lines constructed substantially as fast as the average new munitions plant could be built and put into full operation. Limitations due to shortages of materials, manpower, and transportation for war production would again control, as in World War II, but before the supply of electric power would become a critical factor."

We believe that the industry is in an excellent position to take over its full responsibility for the power supply of the nation in case of war. Of course in this period of emergency the industry will not sit back and leave power supply planning to government experts. Through its chosen representatives, studies will be made and close contact with federal agencies maintained.

In summary, it appears that a stepped-up military program added to very high business activity is in prospect. Such a condition makes past estimates obsolete and points to the need for new assurances that the industry can provide for any emergency.

The Battle of Truth

"BOLDEST and most direct attack on one of our few remaining freedoms," is W. C. Mullendore's opinion of the recent request for information by a special House committee investigating lobbying. The president of Southern California Edison warned the final session of the National Industrial Advertisers Association annual meeting in Los Angeles June 28-July 1 that the threat must not be taken lightly.

The most important and alarming fact in the life of every American citizen today, he said, is that we and our children have already lost much of our freedom and are in grave danger of losing all. We are dependent upon government spending, subsidies, loans, jobs, fiscal policies, and generally upon government as the directing, guiding and dominant force in our entire national life at the present time.

Much of our boasted production, income, employment, and purchasing power is due to the highly destructive forces of a powerful inflation deliberately created and continued as a policy of the federal government. This prosperity is a dangerous phony, Mullendore declared, stimulated by excessive and unsound government spending, financed by inflationary expansion of government debt and government guarantee of unsound private loans, by legal counterfeiting, and by the insidious theft through inflation of the savings of thrifty people.

The present unsound and unbalanced situation is greatly aggravated by the unlimited and extremely serious obligations which are now maturing in the international sphere. It is a cardinal principle of self-preservation that national leadership should not encourage soft living by its citizens when they are in mortal danger from foreign enemies. Yet, he said, we have been doing just that very thing.

The business community, he urged, should do its utmost to awaken the American people to their danger. As business men we have thus far paid millions in tribute to these forces which are building up destructive and enslaving power in government, and we have spent mighty few cents in any genuine attempt to expose the dangerous and powerful undercurrents which are driving our Ship of State toward the falls. We must act now, he concluded, if we are to win the battle of truth against error in the minds of men.

Need we say more than "Amen."

In a Different Vein

SALES PLANS, promotional programs, all end up in a salesman talking to a customer. What the salesman says and how he says it are the final determinants of how much or how little is sold. In recognition of this incontestable fact, ELECTRICAL WORLD this year directs its annual midsummer lighting feature specifically to the men in the front line of lighting sales. And to this aim, the feature is written in the way lighting salesmen talk to their customers—at least, that was the intention in preparing the material.

Readers of the feature, which is contained in this issue, will find it, therefore, very much different in form and treatment from the usual run of ELECTRICAL WORLD articles. Different, but we hope readable, because that quality, not conspicuously frequent in the output of the business and technical press, was earnestly striven for in the writing. On this score, comments from both those who like and those who dislike the style of the feature will be of much help to the editors in the planning of future presentations.

Quite apart from the manner of its presentation, the material of the feature, much of it contributed by salesmen themselves, includes a large number of ideas useful in selling planned lighting. More ideas were received from salesmen than could be included in the feature, principally because there was not time to get them in. It is intended that the surplus will be published in subsequent issues.

We solicit your comments on this presentation of "Selling Planned Lighting".

Range Load Diversity

YOU CAN'T TELL what the behavior of an electric system load will be before you get the meter readings. Inspiration for this profound observation comes from data on energy requirements of 100 electric ranges all doing the same thing at the same time.

The occasion was the Pillsbury cooking contest in New York's Waldorf Astoria hotel last winter. The 100 ranges were hooked up on four circuits of 25 each, a total connected load of 1,170 kw. It was estimated that the peak half-hour demand would be 450 kw, and wiring of capacity for that load was installed.

But the highest demand turned out to be only 83.16 kw. Against the possible maximum demand of 11,700 w per single range this total demand of 100 ranges shows a diversity factor of 14. This is not a true figure because the four circuits were not metered in total, but separately. The true figure would probably be considerably higher. Of the circuits, the highest peak demand was 25.2 kw and the lowest 19.2 kw, giving diversities of 11.6 and 15.3 respectively.

Here was a load set-up that apparently was easy of estimation—100 contestants starting in at one time to show their cooking skill. The fact that diversity was so much higher than was anticipated and that so much difference in diversity appeared between range groups are proof that dogmatism in respect, at least, to range load characteristics is unjustified. This is another way of saying that a utility should not take another's word for load characteristics but should dig out the data by research on its own system. From such individual research and analysis will come more knowledge, and from such knowledge will come better service.

The Electrical Week

Washington is making plans for the industry's part in the nation's mobilization program. At present the plans of a necessity must be sketchy. But there is to be no WPB, Interior will administer any power controls imposed, and Regulation W to control installment selling of electric appliances is on the way back (p 70) . . . If controls are reestablished, the first will be applied to steel and non-ferrous metals (p 71) . . . The Interior Department has been reorganized with William E. Warne in charge of water and power development. C. Girard Davidson will have charge of mineral resources, and Dale E. Doty will manage public lands (p 71) . . . The Reclamation Department has dedicated its engineering center at Denver (p 72) . . . Atomic power held the spotlight at the Fourth World Power Conference in London (p 73) . . . The Army Engineers are developing the Cumberland River Basin. Present plans call for 900,000 kw of capacity at 15 of 16 projects (p 74) . . . Rochester Gas & Electric Corp stockholders have voted to drop the cumulative voting clause from its charter (p 76) . . . And output for the week ended July 22 swept to a new high of 6,185,702,000 kwhr (p 77).

• • •

The District of Columbia Court of Appeals has stayed the order of Judge Alan T. Goldsborough wiping out a gas rate increase granted Washington Gas Light Co by the District Public Utilities Commission. Judge Goldsborough's order, issued with an opinion that included an attack on utility regulatory bodies (EW, July 3, p 65), will be argued before the the appeals court in October.

Prospective tax boosts for next year far exceed President Truman's call for immediate increase of personal and corporate rates. Present plans include corporation levies even higher than the top rate of 45% now being sought. An excess profits tax, based on 1947-49 earnings, also will be demanded.

Nebraska is smarting under a new reprimand from Interior Secretary Chapman. Chapman criticized a state-proposed Reclamation project and urged Nebraskans not to plan individual, unrelated projects. The Secretary earlier deplored bickering among Nebraska public power agencies over who is to get federal power from Missouri Basin projects.

The House Un-American Activities Committee has recommended that James J. Matles, United Electrical Workers organization director, Julius Emspak, UE secretary-treasurer, and three other UE officials be cited for contempt of Congress. The union leaders refused to tell the committee whether they are or ever were members of the Communist Party.

West Penn Power Co observed that during a heavy sleet storm trees trimmed to clear distribution lines stood up very well. Untrimmed trees, however, bent over or broke damaging trees and surrounding property.

SEC has approved distribution of the stock of Eastern Kansas Utilities, Inc (Fort Scott, Kan.) by the United Light & Railways Co to its stockholders (EW, July 10, p 11). The decision overruled a group of Kansas electric co-ops who had asked for a 60-day delay so that they could bid for the properties.

New England occupies only 1.1% of the country's land area and has but 4.7% of the population. Its developed hydro, however, totals 7.4% of U. S. "active" water power.

The federal government welcomed in its new fiscal year July 1 with a cheery statistic. The government went in the red only $3.5 billion, less than expected.

Total installed capacity as of July 1 was 65,596,444 kw.

Notes From The News

In two weeks Sarnia, Ontario will become the first Ontario city to undergo complete changeover from 25 to 60 cycles as part of the Ontario-Electric Power Commission's $200-million conversion program. The final cut over is scheduled for Aug 2 . . . Empire District Electric Co has completed a 30,000-kw addition to its Riverton power plant, bringing plant capacity up to 100,000 kw . . . The Pennsylvania Department of Labor and Industry's Certificate of Merit was awarded to Philadelphia Electric Co for the 20th consecutive year. The award was presented to the employees of the utility "in recognition of a safety record better than the state average" . . . Pennsylvania Electric Co is beginning a two-year building project on a $12.5-million addition to its generating station in Erie. Facilities will be installed for the removal of all fly ash, and two new 400,000-lb-per-hr boilers will replace the present six low-pressure boilers . . . Egypt has hired the British engineer, Sir Murdoch MacDonald, to help supervise construction of four dams on the Nile. The Ministry of Finance expects to raise a good part of the funds necessary for its electrification program through national loans.

Washington Plans Industry Controls

Interior May Administer Controls for Electric Utilities; Sawyer Raises Cry of 'Power Shortage'; No WPB but NSRB Will Handle Policy Matters

W. STUART SYMINGTON—*(NSRB)*
Will determine mobilization policy

CHARLES W. SAWYER—*(Commerce)*
Will issue allocations and priorities

OSCAR L. CHAPMAN—*(Interior)*
Will direct controls for power, fuel

INDUSTRY LOOKED to Washington last week for light on the role it must play in the nation's mobilization program. It got only a partial answer.

President Truman had a program. In the Defense Production Bill of 1950, which Congress made its first order of business, he asked for broad powers to control production and credit. He was preparing other legislation—to up taxes, perhaps to control manpower. But Congress indicated it would have something to say about such programs, that it would not be stampeded into granting the President his every request on his own terms.

Control Details Sketchy

Further, even the Administration spoke vaguely of the proposed controls. Spokesmen, including Commerce Secretary Charles Sawyer, said that some mandatory controls in the Defense Production Bill might not be used, that they were wanted as a club-in-the-corner. At first, at least, priorities and allocations—for example—would be set up on a voluntary basis. And there was considerable vagueness as to how the program would operate—who would allocate what items, and when.

News for the electric power industry was especially vague. And what appeared on the surface was disturbing:

1. Responsible federal officials were talking of a "power shortage," or something closely akin. Secretary Sawyer, for example, told a Senate committee that despite the tremendous expansion of the national power supply in recent years, "there still isn't enough." Other government spokesmen asserted flatly that tremendous increases of aluminum production and other manufacturing capacity utilizing considerable electric power were imminent.

2. Present Administration plans call for existing federal agencies to administer the mobilization plans. Establishment of a new War Production Board definitely is not being considered by the Administration. It's a Truman decision that probably will stick—at least until "existing agencies" bungle the job.

Most significant result of the no-WPB decision was the apparent assignment of electric power controls to the Interior Department. Administration plans last week called for the National Securities Resources Board to handle only policy matters—to umpire quarrels among other mobilization agencies, watchdog civilian requirements, suggest possible new legislation.

Commerce to Allocate

The Commerce Department was slated to issue priority and allocation orders, possibly also orders to curtail unessential production and to cut inventories. But these orders would be drafted essentially by "claimant" agencies, including Commerce and various bureaus. The claimant agencies would screen requests for steel, for example, from certain industries, then ask Commerce to issue or withhold allocation and priority orders.

Interior apparently was set to do this job for the electric power, coal and petroleum industries. And it appeared likely that Interior also would administer any other controls—like manpower—for those industries if and when other controls were set up.

Legislation Is Broad

The Defense Production Bill spelled out none of these mechanics of administration. It simply proposed to delegate to the President broad authority to establish priorities and allocations, to requisition production materials and facilities, to make loans and guarantee loans for plant expansion, to control consumer and real estate credit, and to curb commodity speculation. But NSRB, Commerce and Interior, among other agencies, were preparing to handle some of these powers last week.

The Federal Reserve Board was ready to reimpose commodity controls—the old Regulation W. Best guesses available—FRB was not talking—were that credit for appliances would be limited to periods of 15 months, with down payments fixed at 10% to 20%. Another damper on appliances loomed in the authority sought to cut back non-

Allocation of Metals Will Come First

Steel and non-ferrous metals—most of them vital to production of electric power equipment—will be among the first items subject to allocations and priorities. Secretary of Commerce Charles Sawyer, whose Department will administer this portion of the industrial mobilization program, made that clear in testimony before a Senate committee last week.

He said that several metals were in, or approaching, critical supply. He described the situation in regard to four of them in the following terms:

STEEL—Though production capacity as of July 1 totaled 100,564,000 tons, users were cutting into their inventories even before Korea. Rush orders since have greatly aggravated the supply situation. Since 1948, steel distribution has shifted significantly. Shipments for automobiles jumped 95%; for construction, 22%; refrigerators, 52%. Freight car builders, a major user, took 76% less.

TIN—Capacity for smelting, alloying, and fabrication is adequate. But we lack domestic supplies of ores and concentrates. We import part of these from Southeast Asia, now in the path of the Red conquest. Last year supply about equalled distribution at about 100,000 tons. Supply this year will be greater if our ore sources remain open. But so will demand with prospects of a deficit.

COPPER—Refining and fabricating capacity has doubled since the start of World War II. Some idle capacity can be put into operation. But ore and concentrates aren't readily available to feed our refining capacity. Of approximately 1,500,000 tons available in 1950, about 300,000 tons will be imported. Demand for finished products will be about 1,800,000 tons. The excess can be met only by drawing on stocks which already are at low levels. For "many months" imports of ores and concentrates and imports of refined metal cannot be "significantly increased."

ALUMINUM—Some existing plants could be reactivated after a period of several months provided power is available. Present supply, including imports, will be 1,075,000 tons. Of this, domestic ingot capacity will supply 600,000 tons. Distribution (demand) will approximate the total supply. Working stocks are down since the first of 1950. Bigger military demand means civilian needs cannot be met in full.

essential production, probably to be administered by the Commerce Department. It seemed likely that military demands for steel and other essential materials used in appliances would bring use of this authority within a few months.

First Congressional opposition to the Defense Production Bill centered around its proposal to give the President economic controls on a non-emergency basis. Administration spokesmen argued that the need for mobilization—to meet the threat of Communism—was long-term. They said the nation may be forced to channel a large share of its production and manpower into arms for years, perhaps decades.

Critics of the legislation said that, long-term or short-term, the country's situation constituted an emergency. And they wanted to give the President such broad power only on an emergency basis.

Work Slated to Begin on Greek Power Plan

Work is scheduled to begin shortly on a program to increase electrical capacity in Greece by 163,000 kw by 1955. The program will cost approximately $83 million which will be supplied by the Economic Cooperation Administration and the Greek government.

Plans call for the construction of a 68,000-kw thermal plant on the Eubean Gulf, and three hydroelectric plants—a 40,000 kw plant on the Vodas River, a 50,000-kw plant on the Ladhon River, and a 5,000-kw plant on the Louros River. This system also will include about 700 miles of 150-kv transmission lines—the first stage of a national grid connecting all generating plants and serving a large part of the continental area of Greece. Substations and distribution systems are also included in the program.

Chapman Assigns Warne Water, Power Activities

Assistant Secretary of the Interior, William E. Warne, a leading spokesman for federal power, has been put in charge of water and power development in a reorganization of the department.

Other assignments announced by Sec Oscar L. Chapman include C. Girard Davidson, assistant secretary for min-

WILLIAM E. WARNE

eral resources, and Dale E. Doty, assistant secretary for public land management. Vernon D. Northrop holds the statutory title of administrative assistant secretary.

Warner and Davidson previously shared responsibilities for water and power development under geographic assignments made by former Secretary Krug. Reporting to Warne under the new arrangement are the Bureau of Reclamation, Division of Power, Bonneville Power Administration, Southwestern Power Administration, and Southeastern Power Administration.

Although the positions held by Doty and Northrop were added this year in a reorganization plan, the department has had no undersecretary since Chapman became secretary last Dec 1.

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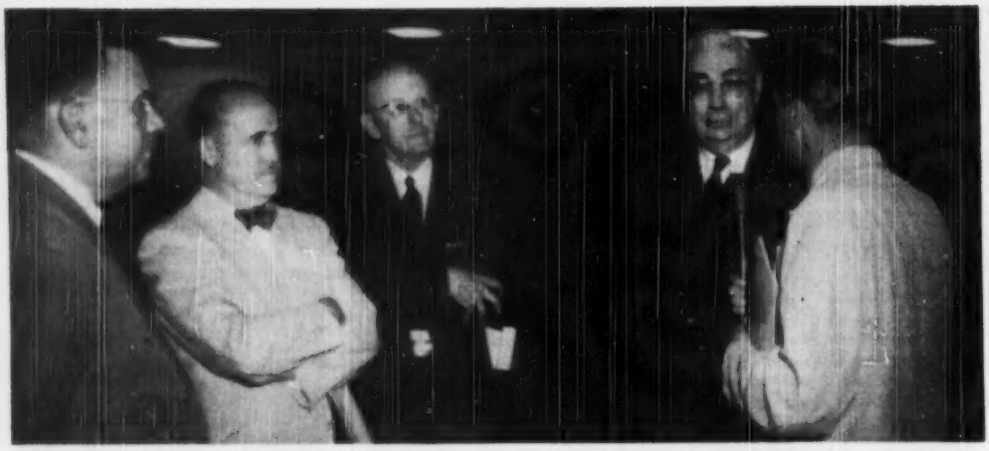
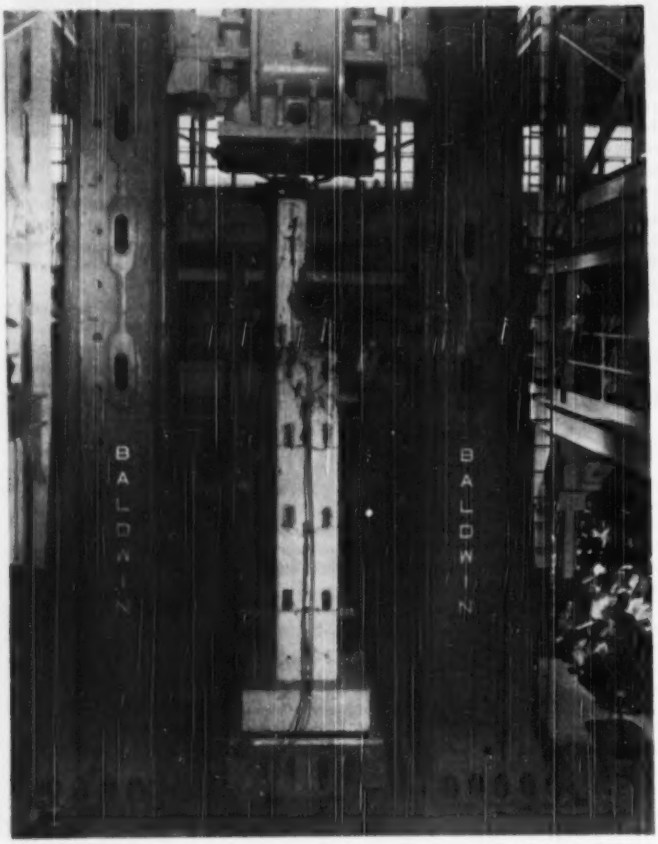
Niagara Treaty Advances

The Senate Foreign Relations Committee has unanimously approved the Niagara water treaty with Canada (EW, July 10, p 6). The surprise move came July 25 after leading committee members had previously indicated indifference if not opposition to the pact. Early ratification by the Senate appeared likely. The new treaty would permit the U. S. to divert more water for power.



AMONG the dignitaries who participated in the dedication of Reclamation's Engineering Center were, left to right, Dr Edward U. Condon, director of the National Bureau of Standards; Dr Robert L. Stearns, president of the University of Colorado; Harry W. Bashore, former commissioner of the Bureau of Reclamation; and Bureau Chief Engineer L. N. McClellan. The latter is telling listeners of Station KEFL, Denver, about work to be conducted at the center. The man with his back to the camera is Dale Morgan, radio commentator



BOOM goes a 22-ft high reinforced concrete column as compressive load of 1,675,000 lb is reached. Demonstration was held in conjunction with engineering center dedication

Reclamation Dedicates Engineering Center

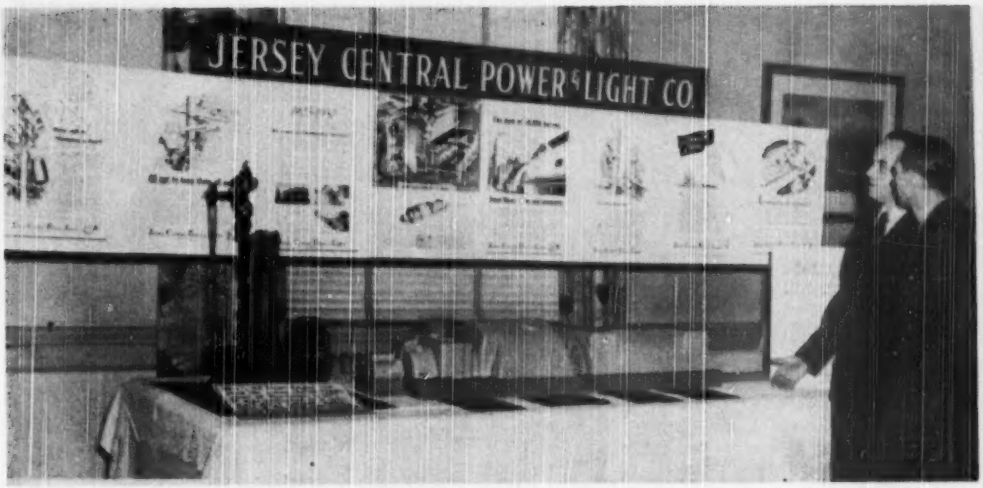
The Bureau of Reclamation dedicated its Engineering Center at Denver on July 20. In conjunction with the ceremonies the center held a two-day open house which attracted over 50,000 persons.

The center is the hub of the bureau's technical activities associated with design and construction of reclamation projects in the 17 western states. Facilities, which are now considered complete, include engineering laboratories, a 5-million lb universal testing machine, a photoelectric laboratory, and a network analyzer. Activities have been carried on at the center since late last year.

In the dedication address Dr Edward U. Condon, director of the National Bureau of Standards, predicted that solar energy plants held at least as much promise of practical usefulness to man as does the possibility of power plants fueled by uranium fission.

He also expressed the hope that the various scientific and engineering agencies of the government will work together on new phases of conservation and natural resources utilization which have as yet hardly been touched. In addition to utilization of solar energy he suggested the systematic study of various proposed methods of influencing rainfall and the evaluation of possibilities of obtaining fresh water supplies on a large scale by removing salt from sea water.

Dr Robert L. Stearns, president of the University of Colorado, officiated at the dedication.



NEWSPAPER REPRESENTATIVES view a Jersey Central Power & Light display showing the utility's current public relations advertising. On table is an original steam engine used by the firm in 1893. Beside it is model of 62,500 kw turbo-generator for South Amboy

World Power Conference Is Told Nuclear Energy Possible in a Decade

ATOMIC ENERGY held the spotlight at the Fourth World Power Conference, which met earlier this month in London. The delegates heard reports that in another decade nuclear power will be a technical possibility. They also heard an angry blast by the Russian delegate against an American report on atomic power.

Both Sir John Cockcroft, director of Great Britain's Atomic Energy Research Establishment at Harwell, and Ward Davidson, research engineer for Consolidated Edison Co, of New York, foresaw the possibility of nuclear power plants within the next ten years. Davidson, however, predicted that it would be several decades before nuclear power would be able to compete, on a cost basis, with power plants using coal or other fuels. He qualified his statement by saying.

"This does not mean that considerable nuclear power will not be used; there are certain to be cases where other considerations will outweigh the actual costs. Such cases may be found, for example, where use is made of energy otherwise wasted in connection with the manufacture of bomb materials, or where the power is used for ship propulsion or like service where the saving due to less weight of fuel is sufficient to compensate for the higher direct costs."

Russia's representative at the conference, Professor Golubtsov, seized upon this statement and interpreted it as meaning that in the United States atomic power would be made available only as a by-product of military production.

"You are well aware," Golubtsov continued, "that atomic energy in Russia is being used only for peaceful purposes, such as for removing mountains when digging new river-beds, for the construction of colossal irrigation schemes, and for turning deserts into blooming areas."

M. Ernest Mercier, chairman of the session at which Golubtsov spoke, asserted that the Russian had twisted the meaning of Davidson's words and that no delegates present were ready to regard peaceful uses of atomic energy solely as the by-product of military activities. His stand was enthusiastically applauded.

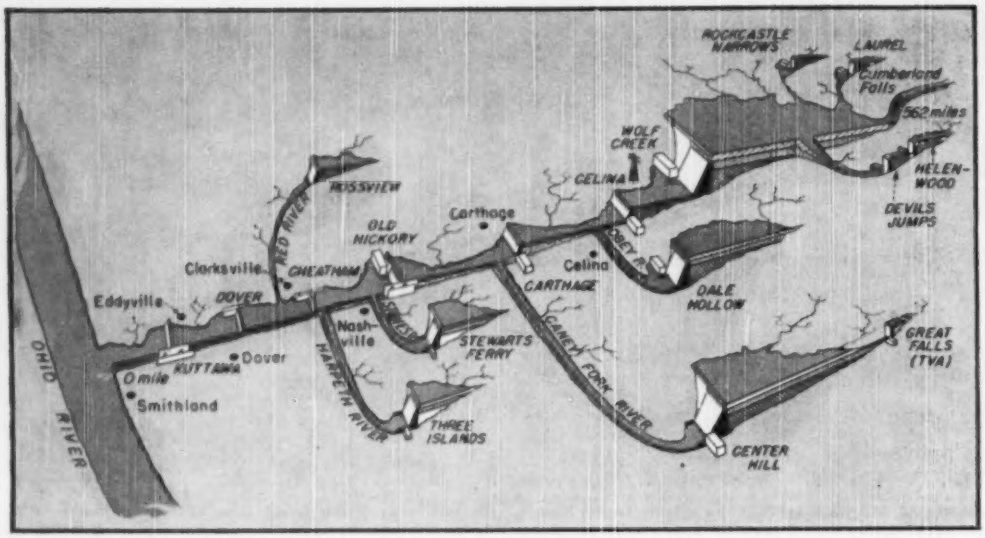
The issue of public versus private development of power popped up in several papers presented to the conference but did not provoke a major dispute. The American National Committee report pointed out that multiple benefits obtainable from a single reservoir—navigation, flood control, and irrigation as well as power—make power available at less cost than if it were a single purpose project.

William E. Warne, Assistant Secretary of the Interior, also cited the favorable results in increased income, employment, power consumption in the Tennessee Valley and Pacific Northwest by contrast to the New England region, "where power is largely steam generated and marketed at higher rates." He praised the "postage stamp rate policy" for the sale of electric power at wholesale at a flat rate by federal government in the Pacific Northwest. Such a policy he said, has encouraged the decentralization of industry and bettered the well-being of the people in that region.

Interior Motion Rejected In Roanoke Rapids Case

The Department of Interior's latest move to block private development of the controversial Roanoke Rapids site (EW, July 24, p 5) has been rejected by the Federal Power Commission.

FPC, July 19, found that Examiner Frank A. Hampton's rulings against introduction of further evidence by Interior "were in all respects reasonable and proper." The commission, however, pointed out that the disputed data could be included in briefs which must be filed by Aug. 2. After the briefs are submitted, Hampton will rule whether he desires to change or modify his earlier finding in favor of the license application of the Virginia Electric & Power Co which has been fighting to build the project.



SIXTEEN DAM PROJECTS on the Cumberland River and its tributaries in Tennessee and Kentucky are under construction or being planned by the Army's Engineers to serve the Cumberland Valley. Ultimate capacity of the projects will be 900,000 kw

Developing the Cumberland Basin

Army Engineers Have 16 Projects Planned; At Least 13 of These Will Have Power Plants; Total Installed Capacity Seems Likely to Reach 900,000 Kw

THE WATERS are rising behind Wolf Creek Dam. By December of 1951 there will be sufficient water impounded to put into operation the first of six 45,000-kw units to be installed there. This project is significant not only because it is a big hydro installation but more so because it is a part of another river development scheme.

The river is the Cumberland which rises in southeastern Kentucky, makes a big bend across northern Tennessee, and comes back to Kentucky to empty into the Ohio. To serve the area drained by the Cumberland and its many tributaries the Army Corps of Engineers have planned projects including dams and powerhouses which will cost $420 million at current prices. Of this amount $121 million, approximately 29%, had been appropriated when fiscal 1950 ended on June 30. All indications are that the remainder will be appropriated whenever needed.

There are 16 projects in the overall river basin development plan. Of the 16 there will be power installations at 13. Of the other three, which are to be built for navigation benefits, two may eventually have power installations added. Present plans call for the initial installation of 811,500 kw of capacity. Ultimate capacity is to be 829,500 kw; but the final total is more likely to be 900,000 kw. Any changes in plans will increase not decrease capacities.

Planned capacity at each of the projects is as follows:

Project	Initial (Kw)	Ultimate (Kw)
Wolf Creek	270,000	270,000
Celina	62,000	62,000
Carthage	90,000	90,000
Old Hickory	100,000	100,000
Cheatham	*	*
Dover	*	*
Kuttawa	0	0
Dale Hollow	36,000	54,000
Center Hill	135,000	135,000
Stewarts Ferry	13,500	13,500
Three Islands	10,000	10,000
Rockcastle Narrows	10,000	10,000
Laurel	20,000	20,000
Helenwood	40,000	40,000
Devils Jump	25,000	25,000
Rossview	0	0
Total	811,500	829,500

*Originally planned for navigation. Power now being considered.

One of the projects, Dale Hollow on the Obey River, placed two 18,000-kw units in operation in December, 1948. There is to be a third unit in the near future.

But it is Wolf Creek which will be the big project. It will have the third largest hydroelectric plant in the eastern United States. Its reservoir will have the largest volume of any hydro installation east of the Mississippi River. Storage capacity will be 6,089,000 acre-ft. This will be allotted equally to power, flood control, and conservation.

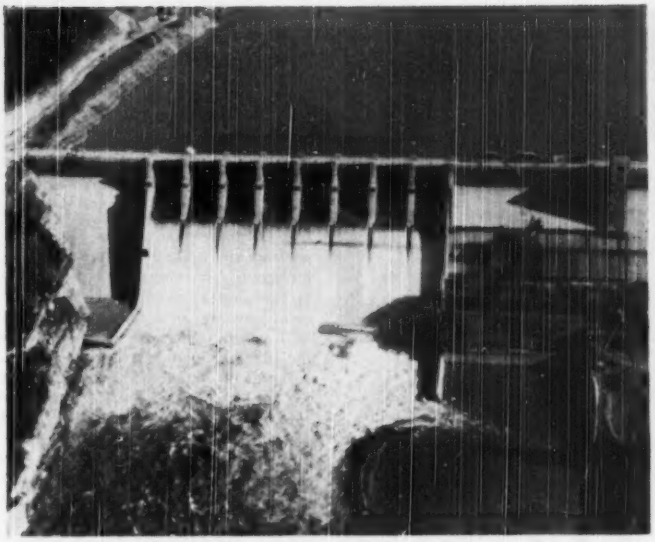
Center Hill on the Caney Fork River was completed for flood control purposes in 1948. Its power plant is now in the advanced construction stage. There are to be three 45,000-kw units with the first going into operation in December. This dam will be 240 ft high, and storage capacity of the reservoir is 2,092,000 acre ft.

The other two fairly large power projects are Old Hickory with 100,000 kw and Carthage with 90,000 kw. Construction has been authorized, and plans are now being drawn.

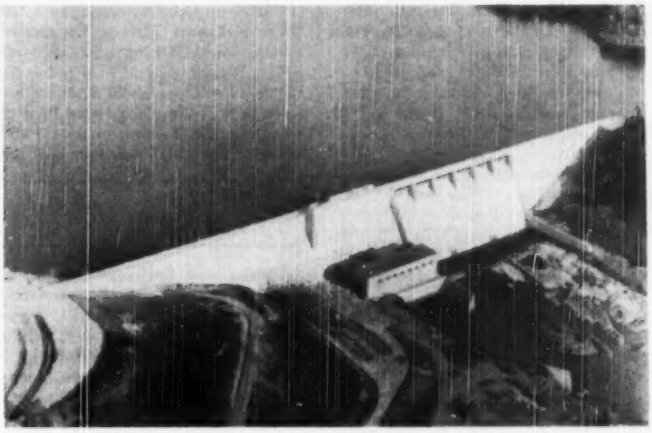
The other projects with smaller plants are in these stages:

Celina—Construction has been authorized, and plans are being drawn for a plant with a capacity of 62,000 kw.

Devils Jump, Helenwood, Rockcastle Narrows, and Laurel—These projects are for power only and are in the over-



CENTER HILL power plant on the Caney Fork River is in advanced construction stage. It will have three 45,000-kw units. First unit is scheduled for operation in December, 1950



DALE HOLLOW project on the Obey River has two units, each with a capacity of 18,000 kw, already in operation. A third 18,000-kw unit is slated to be installed in the near future

all plans for development of the Cumberland Basin but have not yet been authorized. The four are to have a total capacity of 95,000 kw.

Three Islands—Plans are complete. Construction has been authorized. Funds have not been appropriated. A 10,000-kw unit is to be installed. Changes may follow if others are made at Cheatham.

Stewarts Ferry—Plans are complete. Construction has been authorized. Appropriations are expected in the next few years. A 13,500-kw unit is planned. Primarily for flood control, Stewarts Ferry is a small project because of the small run-off in the Stones River Basin and of the highly developed agricultural and suburban residential area of Nashville.

Cheatham, Dover, and Kuttawa—it is now proposed to include power at the first two. Recent advances in design of low-head turbines may make power installations practicable. Construction for navigation purposes only has been authorized.

Rossview—Planned for flood control only. Construction has been authorized by Congress.

REA Loans in Fiscal '50 Totaled $375 Million

The Rural Electrification Administration approved loans totaling $375,151,456 during the fiscal year ended last June 30. This sum brought total electrification loans approved in the 15-year program to $2,205,470,314.

Fiscal 1950 loans were expected to finance 116,898 miles of lines, reaching 337,155 consumers, the agency disclosed in a preliminary report recently. No figures for loans for generating and transmission facilities were listed, but REA conceded these were increasing.

"G and t" loans "still account for considerably below 20% of the total government investment in rural power facilities," the report noted. Unofficial estimates, however, indicate that half or more of the funds approved during the past year have been for "g and t" facilities.

Lines financed by REA in the fiscal year would increase the total to 1,214,603 miles. Total consumers were estimated at 3,689,758. A new record of 185,000 miles of line were energized. On June 30, REA borrowers had 1,025,000 miles of lines in operation. New consumer connections were 485,000, making a total of 3,260,00 consumers served by REA borrowers. And borrowers billed an estimated seven billion kwhr in fiscal '50, 28% above the previous year.

Repayments of REA loans aggregated $40.5 million, $27 million in principal and $13.5 million in interest, bringing total repayments to $244.5 million. Repayments overdue more than 30 days were about $763,000, or less than 0.5% of the total loans made.

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UWUA Scores Victory in 1st Boston Edison Vote

By a majority vote among approximately 2,000 eligible workers, the Utility Workers Union of America, CIO, has become the certified labor organization for so-called physical employees of the Boston Edison Co.

Boston Edison's physical workers, in general, include employees of the transmission and distribution, and production departments. Several other unions, including the International Brotherhood of Electrical Workers, AFL, vied with UWUA in the election.

A second election, involving certain rated engineers and accountants, has been scheduled. It is expected that a third vote will follow for clerical employees of Boston Edison.

The company has about 3,400 employees.

YIELDS (%) — Corporate Issues

Quality	Bonds			Preferred Stocks			Common Stocks		
	1st	2nd	3rd	1st	2nd	3rd	1st	2nd	3rd
DATE									
1950									
July 20	2.63	2.66	2.76	3.83	4.04	4.39	5.62	6.69	7.69
July 13	2.65	2.67	2.76	3.82	4.05	4.41	5.71	6.93	8.05
END OF QRT.									
2nd 1950	2.63	2.66	2.74	3.79	4.03	4.38	5.38	6.51	7.50
1st 1950	2.59	2.61	2.74	3.78	4.01	4.36	5.92	5.85	6.67
4th 1949	2.59	2.61	2.72	3.85	4.06	4.46	5.37	6.15	7.01
3rd 1949	2.61	2.65	2.77	3.88	4.15	4.54	5.55	4.67	7.51

Rochester G&E Amends Charter to Eliminate Cumulative Voting Rule

CUMULATIVE VOTING has been dropped from Rochester Gas & Electric Co's charter.

The stockholders — 98.33% of those voting — approved the amendment at the utility's annual meeting last month. So far as Securities and Exchange Commission officials know, Rochester G&E is the only one of the companies that have been under SEC jurisdiction to discard cumulative voting.

Under cumulative voting for directors the stockholder has as many votes per share as there are directors to be elected. If he chooses, he can multiply his number of shares by the number of directors and cast all the votes for one man. Or he can follow the practice of corporations that lack cumulative voting and cast one share for each directorship.

Object is to give minority interests representation on the board of directors. By pooling their votes minority groups can elect one or more directors.

SEC policy favors cumulative voting, although there is no formal rule. In various cases the commission has supported it against the views of the company. Although more than a dozen states require cumulative voting, most companies coming under SEC jurisdiction do not have it. Most of them acquire it under the commission's influence.

Rochester G&E's management and directors had been studying the question ever since the company became independent of General Public Utilities Corp last fall. Two points bothered them, the potential dangers of cumulative voting and the fact that the common stockholders had never had a chance to express their opinions. The provision had been placed in the charter at the time of the divestment from the parent company.

After staff studies and conferences with outside experts the management concluded that "in spite of possible theoretical advantages, cumulative voting had inherent evils that far outweigh any possible benefits. It could lead to some very undemocratic results whereby, for example, organized minorities could achieve majority representation." Dissident groups could cause dissention on the board and conceivably could elect a majority of the directors if the other stockholders failed to cumulate their votes.

So the company put the matter up to the stockholders. "The results," said Executive Vice President Robert E. Ginna, "speak eloquently that, if given the opportunity, some 15,000 stockholders have decided that they do not want cumulative voting."

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Pennsylvania P&L Sets New Water Heater Rate

A new "floating block" rate for electric water heating has been put into effect by Pennsylvania P&L.

Introduction of the special rate will cut the company's annual revenue by a maximum of $321,400. It applies to unrestricted water heating service on the regular meter and became effective July 25.

Under the new schedule standard residential rates will be applied to the first 150 kwhr. Additional use will be billed at 1¢ a kwhr up to a maximum depending on capacity of the heater. Regular residential rates again will apply beyond this maximum.

The allowable block of 1¢-power ranges from 160 kwhr a month for a heater under 50 gal capacity to 440 kwhr for heaters over 90 gal.

Cut Rates, 10-Year Pact Offered Arkansas Co-ops

Arkansas Power & Light Co has put into effect a reduced uniform rate for wholesale power to rural electric cooperatives if they will sign a 10-year contract to purchase their requirements from the company.

Southwest Arkansas Electric Cooperative Corp, Texarkana, has signed the contract and submitted it to Rural Electrification Administration headquarters in Washington for approval. The agreement provides for a rate of about 5.24 mills. Negotiations are continuing with the 12 other co-ops served by the utility.

Based on demand and consumption for the year ended June 30 the new rate would save the cooperatives about $56,000 from AP&L's present schedule and approximately $100,401 from the Southwestern Power Administration's published rates. It provides for $1.50 for each kw of measured demand, including 250 kwhr per kw of demand, with 2.5 mills a kwhr for the excess. Co-ops would not be restricted in their resale of the power.

One co-op formerly served by AP&L, North Arkansas Electric Cooperative, Salem, now is buying its power from SPA. According to AP&L's rate study, the co-op will pay about $2,087 a year more than under the old rate from the company and approximately $5,060 more than it would under the new rate.

FINANCIAL BRIEFS

Securities and Exchange Commission has decided to postpone any action on the proposed loans to Washington Water Power Co by its parent holding company, American Power & Light Co (EW, July 17, p 77). SEC will not act on the loan proposal until it has been considered by the Washington Public Service Commission. The state body is expected to hold hearings on the loan application soon.

Texas Power & Light Co has called all its outstanding 6% and 7% preferred stock for redemption Aug 1.

Two subsidiaries of Northern States Power Co (Minnesota) have been authorized by the Securities and Exchange Commission to sell some of their physical properties. Interstate Light & Power Co (Wisconsin) will sell its Platteville Division to Wisconsin Power & Light Co, and Interstate Light & Power Co (Illinois) will sell all its physical properties to Northwestern Illinois Gas & Electric Co (EW, Apr 24, p 88).

Congress Approves Law Defining Electric Units

An act of Congress, passed July 13, has defined the ampere, ohm, and volt as decimal multiples or submultiples of the c.g.s. fundamental units. In turn, the coulomb, farad, henry, watt, and joule are related to the c.g.s. electromagnetic units.

Small discrepancies between various international laboratories in the numerical values of electric units have been known almost since they were defined by Congress in July, 1894. The difficulty arose because the silver voltameter, the mercury column, and the Clark cell were specified as the physical standards for ampere, ohm, and volt respectively. The new law, which repealed the act passed in 1894, corrects these discrepancies.

At the same time, advantage was taken of the opportunity to prescribe the photometric units of candle and lumen. The former is one-sixtieth of the intensity of a square centimeter of a perfect radiator at the temperature of freezing platinum.

•

Output Tops 300 Billion in Year Ended May 31

Energy output by electric utilities during the year ended May 31 passed the 300 billion kwhr mark for the first time in any 12-month period, the FPC reports.

For the 12-month period, production totaled 301,340,014,000 kwhr, bettering output for the year ended May 31, 1949 by 4.6%. Production for the same 12-month period a year ago totaled 288,003,714,000 kwhr.

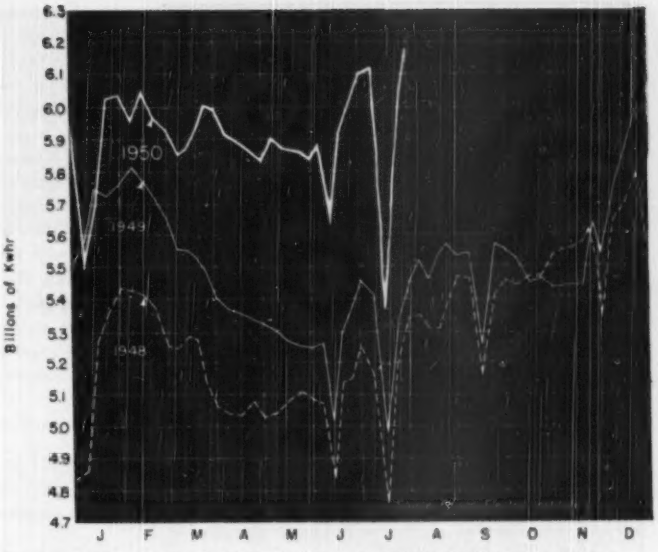
Output for May, 1950 amounted to 26,524,684,000 kwhr, the highest May production on record. It exceeded the May, 1949, total by 13.6% and was 4.3% above April, 1950.

Water power plants produced a record 8,477,107,000 kwhr in May, an increase of 5.2% over May, 1949. Fuel plants produced 18,047,577,000 kwhr during May.

•

Plans Smoke Elimination

Ohio Edison Co plans to spend $800,000 at its Toronto Plant to eliminate soot, ash, and smoke. The program will be completed in two years. Citizens of New Cumberland, W. Va., across the Ohio River from Toronto, have agreed to hold off a federal court suit they were preparing, asking for relief from a smoke nuisance they claimed was caused by the plant.



Output Week Ended July 22—6,185,702,000 Kwhr

Weekly Output, Millions Kwhr			Percent Change from Previous Year		
July 22 6,186	July 23 5,462	July 24 5,342	New England	+13.1	+14.7	+ 5.1
July 15 6,006	July 16 5,342	July 17 5,197	Mid-Atlantic	+10.8	+11.1	+ 8.8
July 8 5,380	July 9 4,982	July 10 4,760	Central Industrial	+17.2	+16.4	+ 7.6
July 1 6,115	July 2 5,410	July 3 5,166	West Central	+ 9.7	+10.3	+ 1.4
June 24 6,162	June 25 5,486	June 26 5,257	Southeast	+17.1	+13.9	+ 9.8
June 17 6,012	June 18 5,373	June 19 5,159	South Central	+11.9	+ 8.9	+10.7
June 10 5,921	June 11 5,300	June 12 5,132	Rocky Mountain	+11.1	+11.3	+ 6.6
June 3 5,632	June 4 5,018	June 5 4,845	Pacific Coast	+ 9.1	+ 9.0	+ 8.2
May 27 5,894	May 28 5,270	May 29 5,076				
May 20 5,845	May 21 5,255	May 22 5,085	Total United States	+13.3	+12.4	+ 8.0

MEETINGS

★**Illuminating Engineering Society**
National Technical Conference, Hotel Huntington, Pasadena, Calif., August 21-24.

★**International Association of Electrical Inspectors**
Northwestern Section, New Washington Hotel, Seattle, Wash., September 10-13.

Instrument Society of America
National Conference and Exhibit, Buffalo Auditorium, Buffalo, N. Y., September 11-15.

Northwest Public Power Association
Convention, Portland Hotel, Portland, Ore., September 13-15.

★**Conference and Exhibit**
Sponsored by Instruments and Regulators Division of American Society of Mechanical Engineers and Instrument Society of America, Municipal Auditorium, Buffalo, N. Y., September 18-22.

American Society of Mechanical Engineers
Fall meeting, Hotel Sheraton, Worcester, Mass., September 19-21.

Public Utilities Association of the Virginias
Annual Meeting, Greenbrier Hotel, White Sulphur Springs, W. Va., September 22-23.

★**National Electronics Conference**
Edgewater Beach Hotel, Chicago, Ill., September 25-27.

Canadian Electrical Manufacturers Association
Annual Meeting, General Brock Hotel, Niagara Falls, Ontario, Can., September 27-29.

★**Association of Edison Illuminating Companies**
Annual Meeting, The Broadmoor, Colorado Springs, Colo., September 27-30.

American Institute of Electrical Engineers
Middle Eastern District Meeting, Lord Baltimore Hotel, Baltimore, Md., October 3-5; Fall General Meeting, Skirvin Hotel, Oklahoma City, Okla., October 23-27.

National Television and Electrical Living Show
Chicago Coliseum, Chicago, Ill., September 29-October 8.

Pennsylvania Electric Association
Annual Meeting, William Penn Hotel, Pittsburgh, Pa., September 19-20. Transmission and Distribution Committee, Irem Temple Country Club, Dallas, Pa., October 5-6.

Indiana Electric Association
Annual Convention, French Lick Springs Hotel, French Lick, Ind., October 11-13.

International Association of Electrical Leagues
Annual Conference, Copley Plaza Hotel, Boston, Mass., October 11-14.

National Electrical Contractors Association
Annual Convention, Hotel Biltmore, Los Angeles, Calif., October 17-20.

★**National Farm Electrification Conference**
Melbourne Hotel, St. Louis, Mo., October 18-20.

★Addition this week.

•

Smith Gets NSRB Job

Robert J. Smith, president of Pioneer Airlines, Dallas, has been nominated by President Truman to be vice chairman of the National Security Resources Board. The Senate is expected to confirm the nomination.

WASHINGTON COMMENT

RONALD D. ROSS

THE ELECTRIC UTILITY industry's position in Washington is improving. It's no major reversal of the New and Fair Deal's federal power policies, but the political fortunes of the industry appear to be perking up.

President Truman in his message on Korea hailed as a sign of national strength the growth of electric power output "from 128 billion kwhr in 1939, to 228 billion hours in 1944, to 317 billion hours now." The President, or anyone else, making even a cursory study of our power situation cannot escape one important fact: Four of every five of those 317 billion kwhrs are generated by private industry.

Evaluation of power for war preparedness must inevitably consider more tax-paying than tax-spending capacity. Today's inventories of our national resources will focus new attention on the record-breaking expansion of investor-owned power facilities.

Tangible political gains have come, too, in the weeks since Korea burst into flame. One was the Senate action in chopping $6 million off Southwestern Power Administration's appropriations for transmission line construction.

It came, of course, as the SPA contract with Oklahoma companies was finally approved. Signed after six years of negotiations, the contract is detailed and technical. In short, its terms are designed to meet the unique problems of one phase of the power situation in one area. It is no pattern for solving industry differences with federal power under other conditions. Above and beyond the terms, however, the Oklahoma contract was a significant development.

Remember that Congress took an unusual interest in the negotiations. It was the Senate last year that told SPA Administrator Wright to do business with the companies before he built a new transmission system in Oklahoma. If the companies won't deal with you, then we'll give you the funds, the Senate added.

Here, then, was a test of the industry's offer to use its facilities to transmit power from federal projects on a large-scale, long-term basis. Signing of the Oklahoma contract will stimulate Congress to press for more company contracts, as a logical substitute for appropriating millions for federal transmission systems which duplicate private facilities.

And don't forget the $6 million. It won't go very far in Washington today, but it's important. That saving to the government is the sort of benefit from dealing with the industry that Congressmen and their tax-paying constituents can understand.

Senate support for this approach has come even more dramatically in the move to halt construction by the Bureau of Reclamation of the Havre-Shelby line in Montana. Reclamation received construction funds for the line last year, arguing that it could serve co-ops at a lower rate than Montana Power Co. But it also was told to negotiate with the company. When Montana Power matched the Bureau rate in April, Reclamation pushed ahead with the line. The Bureau "was in a little too much of a hurry to let the contract," Sen Carl Hayden, Arizona Democrat and chairman of the Senate Interior Appropriations subcommittee, told his colleagues.

Under the Senate plan, which will be taken to a conference with the House, no more federal funds will be poured into the project, and the company will purchase the incomplete line from the government. Savings to taxpayers are estimated at more than $1 million. Here, again, is concrete evidence in favor of doing business with the industry instead of building new federal power systems.

These developments offer encouraging signs for the industry in these times.

TECHNICAL NOTES

ARCHER E. KNOWLTON

(From papers presented at recent Conference Internationale des Grande Reseaux Electriques a Haute Tension)

Double conductors reduce transmission costs 2 to 14% lower than single conductors and the transmission capacity is increased 30%. (405)

High voltage dc experiments in Sweden involve trying some 34 variations in rectifier anode structure; current regulation will reduce dc voltage sharply to avoid commutation failures. (408)

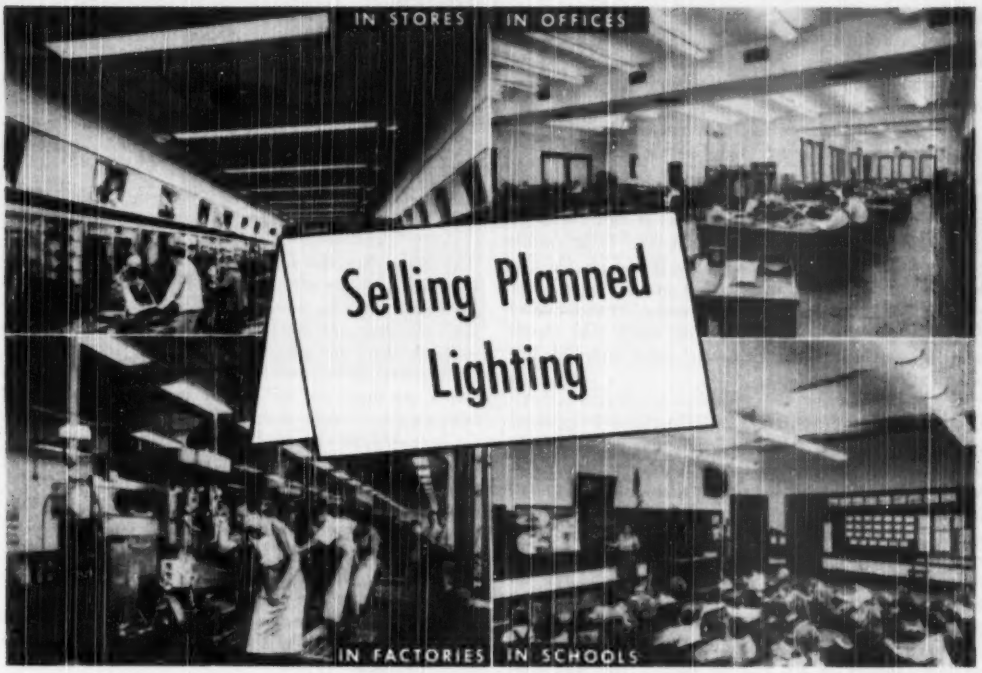
Carrier attenuation increment is about 4 nepers when the ice-covered conductor reaches a diameter of 9 cm; Norway also finds frequencies above 100 kc less subject to attenuation. (323)

Faults in large machine windings are mostly from coils to ground or between coils. Overvoltage tests will disclose incipient weaknesses unless they are turn-to-turn within a coil. (125)

Grounding of generators through potential transformers (or equivalent) with ground indicating relays largely averts the serious coil and core damage accompanying solid neutral grounding. (125)

Thyrite in transformers (1) Limits and controls distribution of impulse voltages and (2) fixes the potential of "floating" windings. (134)

Impulse testing must be given a large share of the credit for the phenomenal improvement in service record of power transformers. (134)



This is for the lighting salesman, personally. Others may read it if they like, and we hope they will; but what is printed here was written specifically for the man who wears out his shoe leather calling on prospective buyers of planned lighting. We speak directly to him:

YOU may be a full-time lighting salesman. You may also be an illuminating engineer. You may be a specialist in one field of lighting. Or selling lighting may be only one part of your job, which also includes commercial cooking, air conditioning, industrial applications, public relations, any one or more of the many duties that, depending on local circumstances may be assigned to you.

But no matter what your title or designation on the payroll—office boy, engineer, all-purpose salesman, industrial representative, meter reader or whatever—when you go out to sell lighting you are a salesman, first, last and all the time.

You may or may not have had the benefit of a training course or other instruction in lighting sales. You may or may not have had experience in selling lighting. If you have had either or both you'll probably find some things here you already know, maybe some you have forgotten, possibly some you don't know. If you can say to yourself when you have read to the end, "Why, I knew all that," don't think you have wasted your time. A review of what he knows never hurts anybody. And if you are a beginner in lighting sales what you learn by reading these pages won't make you an expert by any means. But it should help you to become a better lighting salesman.

As a lighting salesman you have a product to sell and a prospect to sell it to. You should know your product and your prospect. How well you know them will determine the measure of your success in selling lighting.

The product you have to sell is not fixtures and lamps, not electricity to operate them, not even perfect lighting modern in every respect of lumens, lamberts and footcandles. Your product is the performance of modern lighting, its performance in terms of benefits to the prospect. The prospect knows nothing of the means by which these benefits can be obtained. You do not need to know the means either. If you do, and if you are a good salesman, you will not obtrude them on the prospect.

Briefly, the product you offer to the prospect is:

In stores—more customers, larger sale per customer, more profit per dollar of operating expense.

In offices—higher efficiency in operations, fewer errors, more work done, improved health and morale of employees.

In industry—more and better quality production,

safer working conditions, better employee relations, more efficient utilization of production facilities, more value from the experience of older workers.

In schools—protection of children's eyesight and general health, faster learning and easier teaching.

The details and the extension of the user benefits summarized in the foregoing comprise the knowledge you should have of your product.

The knowledge you should have of your prospect is not so easy to state in summary terms. It varies with the individual prospect. It is to be obtained from various sources, including the prospect himself and his place of business. Included is information on the nature and condition of his business, credit standing, economic level, personal characteristics, etc, all of which you should take into account in making your sales approach and presentation.

Confidence is Justified . . . You should approach your prospect with full confidence that he is already interested in your product or that his interest can easily be aroused. He cannot help comparing other up-to-date premises with his own. He may not consciously have entertained the desire to bring his place up to modern standards, may not have said it to himself in definite thinking, but close to the surface of his mind lies the wish to improve his store or office or shop in line with what others have done and are doing.

Further to support your confidence is the promotion of modern lighting in the printed word. This may have reached your prospect in mailing pieces and advertising of your company, probably using the material available in the national Planned Lighting Program jointly sponsored by the Better Light-Better Sight Bureau and the Edison Electric Institute. Or it may have come to him in the editorial and advertising pages of his trade publication. However he got it, you can be quite sure that your prospect has at least some knowledge of modern lighting. It is your job to transform that knowledge, much or little as it may be, into desire for your product, for the benefits he can obtain from Planned Lighting.

Aimed at Readability . . . In the following pages attempt is made to present, in more readable form than is usual in writing to that purpose, information on the product you have to sell and the prospect you have to sell it to, that is, how to make the prospect want the product. For each of the four classes of lighting sales covered—stores, offices, factories, and schools—there are a number of short items, written as if you were talking to your prospect, and the ideas thus presented are repeated in a sort of summary.

The result is perhaps a hodge-podge. But we hope it is an interesting one. We have tried to make it so, in the belief that an interesting hodge-podge has more chance of being read than an uninteresting presentation, however complete and well-organized it may be.

Effort was made to accomplish order and sequence, but that was impossible except in a most general way. There is so much overlapping of lighting and other sales methods and of methods used in the various fields of lighting sales that it was impractical completely to segregate ideas useful in selling lighting in one field from those helpful in another. Thus the school lighting specialist can probably find helpful tips in the notes on selling store or office lighting. Or the industrial man may find in the notes on school lighting sales an idea he can apply in making a sale of factory lighting.

The ideas presented here came from diverse sources, many direct from lighting salesmen. Others were dug-up by the editor who scoured through all material available to him—books and mailing pieces of the Planned Lighting Program, training pamphlets, and committee reports.

The Idea, Not the Context . . . A word of warning is probably necessary. It is to be kept in mind that the items were written by an editor, not by a salesman. It may well be that in his effort to concoct a readable item, the editor has in some cases seriously transgressed the rules of successful salesmanship. For this reason the items are not offered as examples of selling technique, but simply as expositions of selling ideas. You are supposed, as you read, to grab the idea in an item, shake it loose from its printed context if that is necessary, and use it in your own way to help you make a sale.

Ideas that came from the field are identified by initials following the items. Here, again, it should be remembered that the items were written by an editor. If an item looks haywire to you, put the blame on him, not on the man from whom the idea came. By the same token, apology is offered here to any who furnished ideas and who find their contributions distorted or mutilated in the editor's writing.

It was not possible to include all of the ideas that were contributed. The surplus will probably appear in later publication. Therefore any contributor who does not find his initials on an item in these pages should not repine but look forward hopefully.

Thanks a Million . . . For their assistance in encouragement, suggestions and contributed ideas, without which this planned lighting sales feature would not have been possible, ELECTRICAL WORLD tenders its sincere thanks to:

J. Mason Guillory, J. M. Gensburger, O. V. Baldwin, A. L. Baldridge, J. B. Trask, H. J. Twilbeck, J. L. Prendergast, E. R. Tschirn, W. N. Drewes, and P. J. Stouse, Jr, New Orleans Public Service, Inc.

J. S. Schuchert, G. H. Maize, P. E. Keys and A. G. Caplan, Duquesne Light Co.

J. S. Walsh, O. H. Thornall and H. A. Sarcander, Pacific Gas and Electric Co.

C. A. Russell, Boston Edison Co.

H. T. Rankin, R. E. Green, F. Bischofberger and E. P. Mills, Public Service Co of Colorado.

H. B. Gould and Robert Zimmerman, Ohio Edison Co.

Glenn G. Boyd, Public Service Co of Northern Illinois.

Paul H. Hildebrand, L. J. Fetterman, J. S. Milford, W. J. Lontz, C. M. Williamson, W. F. DeLong, R. B. Morrow, L. H. Hornberger, P. G. Wescoe, D. H. Morris, W. J. McCulley, W. J. O'Neil, H. K. Lear, E. F. Rimmer, and W. A. Zeek, Pennsylvania Power & Light Co.

Robert Ligare, Chicago Lighting Institute.

John H. Ronayne and Paul W. Keating, Better Light-Better Sight Bureau.

Selling Planned Store Lighting

BEFORE CALLING on the customer learn all you can about him from every available source of information.

From utility billing records find out how much he is paying for electric service and how much energy he uses.

Figure out his average rate. Possibly an increase in usage will put him on a lower step of the rate and his average will drop considerably. If he is already on the lowest step, then an increase in usage will also reduce the average rate. From these data you can show the customer that more energy for lighting will cost him less per kwhr than what he is paying for present service.

From sales department records see what approaches to the customer have previously been made toward the sale of planned lighting. What mailing pieces have been sent to him, and when? Have you or another salesman called on him before and when? What was the result of that contact? If no sale was made, what was the reason?

Having dug up the foregoing indicated information, now gather together the material you will use in your sales presentation.

This will consist of notes on rates and cost of increased usage, copies of mailing pieces and other promotional material previously sent to the customer, and other exhibits.

These others should include photographs of the same kind and size of store as the customer's and photographs of other stores in the vicinity where modern lighting has been installed. These pictures serve two purposes. They show him what can be done in his own place of business and inspire him to emulate his neighbors. The pictures will be much more effective shown as colored slides in a viewer than as ordinary black and white prints. Included also should be letters from other merchants, known to the customer if possible, expressing satisfaction with recently installed Planned Lighting.

Add to the pile copies of articles from trade publications stating increases in sales and profits following lighting modernization. Add anything available that you think will help convince your prospect.

And don't forget the "Visualizer", "How to Make More Money."

Before entering the customer's store, take a little time to look around. Observe the character of the location, the condition of surrounding property.

Count the number of people who enter the store, who stop and look at the window displays, who pass by without a glance. By this means you can form a rough idea of the proportion of street traffic attracted by the store.

Look for other stores of the same kind in the immediate vicinity. Are they attractively lighted? Do they appear to be taking trade from your prospect?

Look at adjacent stores. Does your prospect's place of business seem dingy in comparison? If so, you can appeal to his pride. If not, you can try to inspire him to excel them.

Inside the store, look for specific examples of deficiency in present lighting—counter and other displays not high-lighted to attract attention, poor illumination of goods in showcases, direct and reflected glare, dark corners, etc. Look also for some complimentary things to say about the store. Say them first. Then point out the specific deficiencies in lighting and tell how correction of them will improve or add to the good features you have already commented on.

Note the appearances and behaviors of customers and clerks. You may find in them certain characteristics unfavorable to selling that Planned Lighting could improve—unnecessarily close examination of merchandise, slowness in locating a desired item, inattention, impatience, lack of interest in goods displayed.

An Ad 27 Times as Big

"I saw that full-page ad of yours in the newspaper yesterday. By the number of people in your store today, it must have had a lot of pulling power. Cost you about $150, I guess.

"Suppose when that ad appeared, the page was so poorly printed that people could hardly read it. You wouldn't have gotten much result from it, would you?

"That ad covered an area of 300 sq in. It appeared one day. You have another ad about 6 by 10 ft—that's 8,640 sq in.—that appears every day. But people can't read it. At least they don't read it, not many of them. I know because I've been checking up.

"I mean your show window. People walk right by. That's an ad that does not pull. You can make it pull with Planned Lighting." (W.N.D.)

What a Personality!

"Did you ever stand outside, Mr. Jones, and judge your store as having a personality—positively attractive or just sort of neutral?

"You know, there are lots and lots of people—fine folks, most of them—who make no quick impression on you. Then there are others who radiate something that attracts you.

"Stores are like people that way. They attract or they don't. Take that new well-lighted store of Brown & Co. just down the street. It has a cheerful look that fairly beams a welcome, inviting people to come in. It's going to be a tough competitor.

"Your store can smile and 'Hello,' too, make customers come in, make them come back. Smiles light up human faces and light can put a smile on the face of a store. In terms of good or poor lighting, your store can have a personality that attracts or doesn't. Good lighting is Planned Lighting, planned to give your store a permanent smile of welcome." (G.M.)

Robbery Reported

"Mr. Smith, what is the first thing you would do if approximately 20% of your last year's gross business receipts were missing?"

"I'd call the cops fast because that would mean about $20,000."

"That sounds very reasonable, Mr. Smith, but how would you feel when you had to explain that the reason $20,000 were missing was because you hadn't considered Planned Lighting to attract customers, allow them to appraise your merchandise and, further, create a fine appearance in your store? Mr. Jones did just that thing in his market. This year he is enjoying the 20% additional business. We have to plan ahead these days so why not let up and light up the Planned Lighting way?" (O.H.T.)

"I Saw One in the Window"

"How frequently do people come into your store, Mr. Brown, and say to a clerk, 'I saw one in the window'?

"Never checked on it, eh? But you will agree that 'I saw one in the window' expresses both the purpose of window displays and their results—the purpose being to attract attention and create desire; the result is the number of people inside the store because of what they saw in the windows.

"I have a plan that will sharpen the purpose of your window displays and increase their results. A plan for more and better light in your windows. Planned Lighting. Here's how it works . . ." (G.M.)

Just Seven Seconds

"Can any of your clerks make a sale in 7 seconds, Mr. White? Of course not.

"I've been holding my watch on people passing your store. They average about 7 seconds to walk past. You have a 7-second chance to make them stop and look. That means you must use every trick of the trade to stop them—attractive store front, attractive displays and brilliant window lighting.

"Your store front is good and your window displays are colorful and arranged with taste. But they lack the lighting to do a 7-second job of stopping people. The lighting must be planned to work that fast. Let me show you how it can be done . . ." (G.M.)

Waiting to Be Waited On

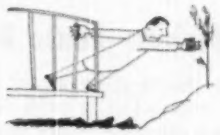
"That's the way to sell. Make the customer feel she's getting special attention. Carriage trade and all that. I'm watching your clerk as he carries that bolt of dress goods up to the front of the store so the lady can see the pattern more clearly. She's being *waited on*, and that's what the women like.

"Takes a little more time to make a sale, but I guess it's worth it. I don't know, though. See that other woman at the counter, waiting for the clerk to come back? Looks like she's tapping her foot. Probably getting a little impatient.

"Maybe if her attention and interest were attracted to a display at or near the counter, she wouldn't be putting her mouth into such a straight line. And maybe if the lighting at the counter were better the clerk wouldn't have to lug that heavy bolt of cloth the length of the store, and he wouldn't have given the waiting customer a feeling that he'd left her for someone more important.

"This is the kind of thing you can avoid by having Planned Lighting in your store—enough light so every-

thing can be seen clearly, more light on items to excite your customers' interest in them. Then the ladies waiting to be waited on won't be so conscious that they're waiting. Suppose I check over your lighting and then give you a report on how it can be improved. Won't cost you anything." (C.A.R.)

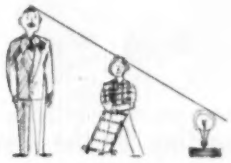


An "Almost" Bridge

"Did you ever hear of a bridge being built shorter than the width of the stream it was to cross? Let's imagine, Mr. Blatt, a meeting of the board of county supervisors considering the plan for a bridge across Possum Creek. One nickle-nursing member notes that the plan calls for a bridge 30 ft long. He says that a 25-ft bridge can be built a lot cheaper and it will go almost across the creek. But you, an intelligent member of the board, point out that an 'almost' bridge won't do what the planned bridge is intended to do.

"Now, here you have a complete layout for Planned Lighting in your store. It is designed like a bridge to carry you across to the higher profit side of the creek. Sure, you can reduce the cost of the installation 10% by cutting out the spotlights. But isn't that making your bridge a little shorter than it should be?

"The difference between good profit and little profit, or between just any profit and none at all for that matter, is the increase in the amount of goods you sell. A comparatively small increase in gross can make a big increase in profit. That's what the spot lighting will do. It will add the little bit more that makes the difference. And your bridge will be long enough to cross the creek." (A.G.C.)



It's Lesser Than You Think

"How about competition? Getting tougher every day, I suppose. Being a retail merchant, you probably know that better than I do. Got to be up on your toes all the time. Better methods, better facilities, better everything. Take lighting. Now, lighting that was good only 5 years ago is just not good enough today, not since wide awake merchants have discovered that it can be used most effectively for selling and not just for seeing alone.

"The day when a merchant could think of lighting as a necessary, but non-productive, expense, like sweeping or stockkeeping, is long past. In its least valuable aspect, good lighting is a service to customers. Your successful competitors supply that service to them. Naturally, they expect it from you, too. And at its best, Planned Lighting is as effective a selling force as expert salespeople. It makes sales and builds profits as they do.

"Yet Planned Lighting is the lowest-cost salesman you can employ. In a store 20 by 60 ft, for 10 hr a day, it costs less than the wages of an errand boy, about a quarter of what you pay a sales person. That's a fact. I can show you the proof.

"Take a look at the stores of your strongest competitors. You'll see the evidence in them. They are the best lighted. But that didn't just happen. It was planned. I have a plan for your store." (G.M.)

Pocketful of Profit

That's right, Mr. Smith, $2,000 for equipment and installation and your electric bill will be doubled. That's what it will cost you for the Planned Lighting I've recommended for your store. Sure, it's a lot of money. If I were in your shoes, I'd hesitate, too. But not very long.

"Because if I were in your shoes, you'd be in mine. And you'd tell me to look at the other side of the ledger. You'd show me these reports from other merchants of planned lighting bringing in more customers, increasing sales, and upping business 10 to 25%.

"I don't know what your annual gross is, Mr. Smith, but I'll bet a 10% increase in it will pay that $2,000 and that doubled electric bill and still give you a pocketful of profit." (G.M.)

Impulse Buying

"You are trying to sell me more electricity. I don't need any more."

"Sure, Mr. Jones, the company would like you to buy more electricity. You'd like your customers to buy more groceries from you. And you'd like to have more customers, too. That's what I am offering you—more cus-

tomers, larger sale per customer.

"Before I came in here, I stood and watched your store for a while. A lot of people passed by. A few glanced at your window, but none stopped to look. Some people came into the store. They entered purposefully, as if they knew what they wanted to buy. Judging from the sizes of the bags and packages they were carrying when they came out, they bought only what they came for.

"What I want to sell you is people stopping to look at your windows, seeing something they want and coming in to buy it. I want to sell you a customer coming in to get a dozen eggs who also buys a box of strawberries although strawberries were the farthest thing from her mind, when she came in.

"Planned Lighting in your windows will make people stop and look and some of them will be attracted into the store by what they see in the window. Then, inside, planned lighting will tempt them more strongly to buy other things—impulse items—called to their attention by the silent but eloquent persuasion of light."

Mirror Windows

"You know, I think I'll quit this lighting sales job. I get to feeling this way once in a while after I've used up all my sales arguments on a prospect and he still says, 'No'.

"I've just come from Lundy's store up the street. And can Lundy say, 'No'. I'll bet he can say it in every language on earth. Why, Mr. Steinbower, he has a chilled-steel sales resistance almost as tough as yours.

"Just dropped in to tell you I probably won't be around trying to sell you Planned Lighting any more. I've decided to be a private detective. You know, shadowing people and all that. I got the idea as I walked up to the front of your store. Nothing to it, this shadowing business. You don't have to follow the guy where he can notice you. Just walk along on the other side of the street looking in the show windows. You can see everything by reflection in the glass all up and down the street—cars passing, people walking along. You're not bothered by what's in the window because you can't see it, not on a bright day anyway.

"Well, I want to thank you, Mr Steinbower, for this swell idea of a new job I got from your store. To show you I appreciate your help I'm going to do as much of my shadowing as I can right in front of your place, because it has the best shadowing windows on Main Street. Also it's a pleasure to watch the girls powdering their noses, using your show window glass as a mirror

"What? You didn't realize? You think you'd like to think about Planned Lighting in your windows? Well, maybe I'll stick to selling lighting." (H.J.T.)

Good Business—Better Business

"Suppose this store were vacant, Mr. Smith, and you had just come to town looking for a location for your ladies' wear shop. Would you take this store?"

"Oh! That's actually what you did 12 years ago? You've certainly built up a nice business. I think I know one important contributor to your success. It is the reason why you took the store in the first place. A busy street with lots of foot traffic going by. You could be sure that some people would turn into your store.

"On that almost mathematical certainty, your business was good at first, stayed good for 12 years and is still good.

"Mr. Smith, did you ever stop to think that 'good' is the first of a series of three words? The other two are 'better' and 'best'. It's comparatively easy to go on from 'good' to 'better', but no one can say he ever got from 'better' to 'best', because you can always hope to better the best.

"It's particularly easy to go on from good business to better business in a store like this now that the idea of Planned Lighting has come along. Planned Lighting in your show windows will turn more of that valuable foot traffic into your store and Planned Lighting inside here will persuade those who come in to buy more. Here are some pictures of stores with Planned Lighting. Let me show you what their owners say about good business made better by it." (J.B.T.)

Lighting in the Raw

"Did you ever eat a 'Tartar' sandwich, Mr. Goldman? Raw hamburger and a thick slice of powerful onion. I can see by the expression on your face that the idea revolts you. Does me too. But there are people who do eat them. Claim that the raw meat has a lot more vitamins or something. Probably it does. And then with the onion. Boy, what it does to the breath. A fine way to lose friends and influence people in reverse.

"You are perfectly right in what you say about this Planned Lighting layout I've made for your store. You can get the same amount of light, even more light, with the same number of non-shielded, barelamp fixtures that

will cost you less money.

"But you are just fixing yourself a 'Tartar' sandwich. Like the meat, the light will be raw and the glare from it like the strong onion. Let's cook the meat, Mr. Goldman, and throw away the onion by putting in the right kind of a lighting installation. Then you'll have a store that will really attract people, not turn them away from it." (A.G.C.)

Attract—Buy—Come Back

"Everything has gone alphabetical now, hasn't it, Mr. Dubois? Take this Planned Lighting that I'm trying to sell you. We call it PL. Add another PL to that and we have PL-PL which tells why in your own interest you should buy Planned Lighting and why the power company pays me to sell it to you.

"For you, PL-PL says Planned Lighting means profit lighting because with it you sell more merchandise to more customers. For us PL-PL says Planned Lighting means profit load because we will sell more electricity to you. Profit for you, profit for us. What could be fairer?

"Simple as ABC. Golly, that's another one of those alphabet things. Just thought of it in connection with that show window lighting we've been talking about. ABC—attract—buy—come back. Glamorously lighted, the dress in the show window attracts a passing girl. She buys it, then later comes back because she remembers the quality of your goods and the low prices of them.". (A.L.B.)

Show Business

"Yes, that 1-3-5-10 formula. It's just a convenient way of saying enough light, more light, even more light and most light. And it is a set of light ratios that are reasonable in application today. It's possible that 10 years from now, as light sources and equipment improve, I'll be in here talking about a 1-4-10-50 formula.

"What the formula says is important in show business. On a brightly lighted stage the scenery and props have enough light to be seen clearly, the chorus girls stand out in a flood of light from the wings, and a brilliant spot is focused on the hero and heroine in the center.

"Merchandising is show business, too, bearing down heavy on the word 'show'. Because if you don't show your goods, you're not likely to sell them. So we just borrowed the idea of lighting emphasis from the theatre and put it to work in retail stores.

Plenty of Light

"I see that your store is well lighted. No dark corners. Everything can be seen clearly. You certainly have all the light you need.

"That is, you have all the light you need for customers and clerks to see their way around and find what they are looking for. But I don't notice anything that stands out from the rest and says, 'Buy me.'

"Oh, that blouse on the stand, there? Yes, I see it's a very nice bit of merchandise, now that you point it out to me. And the price doesn't seem high either.

"And those items in the showcase. They look nice too. But the reflection on the glass from that light overhead sort of makes me blink.

"Mr. Smith, did you ever try to read your customers' minds? I don't suppose any of them consciously think the way I've been talking to you. But I believe if you could go deeply enough into their minds, you'd find subconscious reactions like I have indicated.

"See that woman just going out the door? I watched her. She walked straight to the counter over there, told the clerk what she wanted, got it and walked right out. Must have been in a hurry. Or maybe she didn't notice anything in particular."

Quality Tailor

"Have you noticed that new men's clothing store that just opened up down in the next block, Mr. Sweet? Of course you have. No one could miss it. It's about the best store lighting job in town. It should be. I made the lighting layout myself. The manager said, 'Don't spare the horses, Bob. We've learned from our other branch stores that a complete installation of Planned Lighting is the best and lowest cost salesman we can

have! So I gave him the full treatment, and does he love it!

"I don't suppose you're worrying any about competition from that store. The 'Crafty Craft' suits featured there won't attract your customers—solid citizens who've been having their suits made by you for years. No, that store won't take any of your old customers from you.

"But what it probably will do—and this is something to think about—is to slow down the rate at which you gain new customers. Here's a young man, on his way up, going to be a wealthy man some day. You can expect him to be a customer of yours then. He knows your reputation and he's going to have his suits made here when he can afford it.

"That's the joker. If you leave it to him, make no effort to attract his attention, it will take him a long time to make up his mind that he can afford to wear a Sweet suit. But if you put Planned Lighting in your show windows, and he sees a beautiful piece of Harris tweed there, he's quite likely to discover that he can afford a Sweet suit much sooner than he expected.

"Let me make you a layout of Planned Lighting, tailored to the quality and reputation of your shop, just as you tailor your suits to the measurements of your customers." (W.N.D.)

Psychoanalysis

"I think maybe I'll go get myself psychoanalyzed. Funny thing, Mr. Quackenbush, every time I come into this store of yours I think of my high school days and I can't trace the connection.

"No, it hasn't anything to do with those sport shirts or the neckties I see so dimly over there. Ah! Dimly—dimly—that's a clue. High school—classes—studies—subjects — algebra — Latin — geometry — English lit — poetry—I've got it!

"Our lit teacher was nuts about Gray's 'Elegy in a Country Churchyard', made us learn the whole thing by heart. That's what comes shoving up in my mind when I walk in here—a verse from that poem. You know it:

'Full many a gem of purest ray serene
The dark unfathomed caves of ocean bear;
Full many a flower is born to blush unseen
And waste its sweetness on the desert air!'

"And I can see why that verse was uncomfortable in my subconscious. You've got a lot of beautiful merchandise in here, but it can't be seen, not properly, anyway. Not if you want to sell it and I suppose you do. For Heaven's sake let me put Planned Lighting in here so I can get rid of this complex."

Costs and Profits

"Mr. Jones, you buy an item of merchandise for 60¢ and sell it for 90¢. Most people would say you have a profit of 50%. But you know that isn't so. Out of that 30¢ spread must be taken that particular item's share of rent, wages, insurance, heat, electricity and other operating costs. Also out of it must come interest on the 60¢ cost of the item for as long as it lays in stock. You'll be lucky if you have a nickel left of that 30¢.

"Now, Planned Lighting is not going to reduce the total of your operating costs. But it is going to reduce the share of operating costs charged to each item sold. Because there will be more items sold, more of them to carry the total operating costs, less of a cost burden on each.

"But you know all this better than I do. I just mention it to show you the effect of Planned Lighting on your cost of doing business."

Planned Packaging—Planned Lighting

"Will you take a look at this magazine, Mr. Boone? No, I'm not trying to sell you a subscription. You can see by its name, 'Modern Packaging', that it isn't in your business field. I just want to show it to you to give you an idea of what is included in the job of packaging attractively the goods you sell and in getting them from the producer to your shelves clean and bright and undamaged.

"Just leaf through the pages of the magazine. You can see from them that a tremendous amount of thought and work is involved in providing you with merchandise packaged to catch the eyes of your customers. But all that thought and work goes for little if the merchant does not continue with his part of the job—show the goods effectively. He needs lighting to do that, Planned Lighting and plenty of it.

"Planned Lighting will give your packaged goods opportunity to use the great selling power they have and for which the producers paid out a lot of money to designers and artists and printers and other experts. When you don't take advantage of this selling power, you're just letting profit get away from you." (E.R.T.)

Selling Planned Office Lighting

Before you start out to sell, pick the right prospect. In every line of business, in every city, some firms set the pace for others. Pick the prospect who's already ahead—he's making money, not afraid of new ideas. Look through the business page of your newspaper for companies who are planning expansion, reporting high profits—they're your meat!

Be sure that you're talking to the right man in each office, the one who can authorize expenditures for new equipment. In many offices, the office manager has this authority—in some, he's a glorified office boy. Judicious questioning can help here—the girl at the switchboard usually knows who's who in the office.

While you're waiting, look around the office. If furnishings are modern, with photo murals, etc, talk about lighting for appearance. If the office is unimpressive, if they appear to watch pennies, talk economy—fewer costly mistakes with good light. If employees appear rushed, harassed, show how good light helps get work done faster.

In Planned Lighting you have a powerful sales tool, if it's translated into your prospect's language. Every business makes plans, for efficient flow of work, quick production, etc. Find what plans your prospect has to make in his business—show him how it's equally sensible and necessary to plan lighting.

The booklets, visualizer and other tools which the Planned Lighting Program makes available were prepared by the industry's leading talent . . . but they're no help to you in your briefcase. Use them on every call, and watch the effect on the prospect.

Your sales kit is not complete without a file of photographs or slides of good local installations. You're the best man to get these pictures. A photo of good lighting in an office, run by a man your prospect plays golf with, is one of the best salesmakers you could possibly have.

If you feel a job is close to being sold don't wait to make layout and to get cost figures together until the prospect says the final "Yes." Be ready with the complete plan when you make the closing call. The ripe apple may drop from the tree sooner than you expect. (J.H.R.)

Aspirin Survey

"If I could be satisfied to sit at a desk all day, I think maybe I'd like to work in an office like this. All those windows along the side, high up, nice view and all. Not so good though for the folks with desks back from the windows and along that center wall.

"Yes, I see you have fluorescent lighting. Installed a few years ago, I guess. Fellow that sold you that hare-tube job said it would cut down your electric light bill, I bet. Probably it did. Didn't cost much to install either. I see the fluorescent fixtures are hung right where the old ones were. Makes the light kind of spotty, doesn't it? Look, the light meter shows 20 ft-c on this desk. Let's see what it is on that one over there. Only 5.

"Did you ever make an aspirin survey of this office? Silly, isn't it? If you did, though, I wouldn't be surprised if you found more pills in this row of desks than in those along the windows. Because spotty lighting—there's some glare, too, from those fixtures—gives people headaches, especially people working all day long at tasks requiring close visual attention like in this office. Then they don't work so well.

"You know, Mr. Stewart, you can save money in an office like this in two ways. One is by cutting down expenses. The other is by raising efficiency, by getting more work done. Some years back you saved a little money on your electric bill by putting in fluorescent lighting. You can save a lot more by installing a properly designed job to raise efficiency. But it has to be done right, Planned Lighting. Let me show you . . ."

In the Dentist's Office

"Look, Doc, what your office needs is some new magazines. I don't know though. Maybe it'd be a waste to lay out a lot of money on magazines. Nobody could read them, not with the light in that waiting room.

"Say, are you an amateur psychologist as well as a professional dentist? Probably you have it all figured out. After sitting a while in that atmosphere of vintage periodicals and dim unholy light you figure the patient will have a welcome feeling of release when his turn comes to climb into this chair.

"Well, let me tell you you're wrong. I had nothing to do out there but think, not happy thoughts either, even though all I came for was to have a check-up and

a cleaning. I didn't have any toothache, but I darn near accumulated one, wondering if you'd find anything wrong with my choppers.

"Now if I had had a nice new magazine, anyway one that still had a cover on, and enough light to read it by, I'd probably be my normal cheery self at this moment. Instead, I feel pretty low, lower than a lighting salesman should ever feel. Why, I'd nearly forgotten that that's what I am, a lighting salesman. As soon as you let me out of this chair I'm going to sell you Planned Lighting for that waiting room. Then you'll have to buy some new magazines."

Holding Tenants

"Sand blasters are starting today on the stone work of the old Hobbs building. Owners are going to clean it all up, remodel the entrance, put new fronts on the stores, take out the old cage elevators and put in new high-speed ones, modernize from cellar to garret. I've been working with the architect and he tells me that he's going to put Planned Lighting in every office in the building.

"I guess the owners got tired of paying higher taxes every year and not being able to raise the rental scale proportionately because of the competition of newer buildings like this one of yours.

"But the Hobbs building is in a fine location and it will be pretty attractive to professional men when the modernizing job is finished.

"Let's see, this building was put up in 1940, wasn't it? Only 10 years old. And it's been well maintained. It'll be a long time before you have to spend money on extensive modernization because in most respects the building still is modern. Only thing is, there's been a lot of development in lighting in the past 10 years. We've learned a great deal about seeing and how to provide the proper light for different kinds of seeing work. Planned Lighting, we call it.

"Yes, I know there's a shortage of office space in this city. But mostly the demand is for low-rent space. These younger professional men, just getting started, can't afford the rent you're getting from doctors and dentists and lawyers with established practices.

"Old solid family name, old solid construction, location on the best corner in the city; an office in the Hobbs building always gave a certain prestige and dignity to a professional man. But I don't suppose any of your tenants will be tempted. There's a certain prestige and dignity in having an office in this building, too. Only thing the Hobbs will have on you is Planned Lighting.

"What's that? Sure, I'll be glad to go and see your architect."

Save at the Spigot, Lose at the Bung

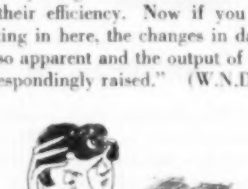
"You certainly have plenty of daylight in this office, Mr. James. Windows all along both sides. Office is not very wide, either, and you get a fair amount of daylight on the desks in the center.

"No night work here, I suppose. The rather sparse lighting installation you have tells me that you only use the lighting on dark days and in the late afternoons of winter.

"Well, that's one way to economize. The old-time crossroads storekeeper who measured out vinegar and molasses and other liquid groceries from the barrel had a homely proverb that, I think, would apply in this office. 'Save at the spigot and lose at the bung', he used to say.

"Yes, Mr. James, what you are saving in the cost of lighting you are more than losing in the wages of employees. I mean that. I can show you, in writing, evidence from other offices of output per worker substantially increased by Planned Lighting.

"You see, daylight is not uniform in quantity, quality and distribution even outdoors. Much less so under a roof. Your people are working under changing light conditions all day long. That affects their eyes, affects them, affects their efficiency. Now if you had modern Planned Lighting in here, the changes in daylight would not be nearly so apparent and the output of your workers would be correspondingly raised." (W.N.D.)



Spotty Foot-Candles

"Here I am, Mr. Evans. My name is Bill Johnson—from the power company. You asked us to check the lighting in this office. I can see right away what the trouble is, without doing much checking. You saw it, too. That's why you called us. Maybe I should say you were conscious of it without seeing it. Not enough light and too few lights. That makes it spotty, what light there is. I imagine your people here complain of headaches quite often, don't they?

"Yes, Bill, they do. And they slow down quite a bit in the late afternoon, atlhough they're all good workers."

"Well, let's do some checking with the light meter. First, though, I should tell you this meter registers footcandles. That's quantity of light. It doesn't judge the quality. And quality of anything, as you know, is just as important as quantity.

"Here, you take the meter and put it on the desk of that billing machine operator. She ought to have 30 to 40 ft-c for the work she's doing."

"The meter reads 25 ft-c."

"A little low, but not too bad. Now suppose you place the meter right where she looks as she works."

"Why, it's only 10 ft-c, a lot lower than you say is necessary."

"You see now what I meant when I said the lighting here is spotty. Let's try some other places." (J.M.G.)

Fast Work to Close the Sale

"Hello, Mr. Black. I got your call and came right over. I see you're making a lot of changes. I suppose you are ready to go ahead with the relighting we talked about a couple of weeks ago. I can have the blueprints ready in a couple of days."

"No, I'm not ready for that. This other work is costing me so much money I can't afford to install an expensive lighting system now. I called to ask you to relocate the present fixtures for the new positions of the desks. I have an electrician waiting. Just show him where the fixtures should be moved to."

"Look, Mr. Black, these changes you're making are costing you plenty, I know. You wouldn't be making them if you were not sure the cost would be repaid. I judge you're laying out around $1,200 on them. That's about $3 per sq ft."

"I'm spending a little more than that."

"Well, you can put in the modern lighting we talked about for only 40¢ per sq ft. Less than that if you deduct what it would cost to relocate the present fixtures as you want to do."

"That may be true. But I just can't afford it now."

"Look at it another way. On a five-year basis, the installation we talked about would only cost you 9¢ per day, 1.8¢ per employee per day. On that basis you can't afford not to have modern lighting in view of the improvements in employee efficiency, morale and health.

"Certainly sounds reasonable. But I can't wait for you to make blue prints and get estimates."

"Well, Mr. Black, it just happens you won't have to wait. Right after I talked with you a couple of weeks ago, I started to figure this job. I have the whole thing clearly in mind. I know exactly where the new fixtures should go. I'll show the electrician and you and I will go and select them at the company lighting center. What do you say?" (O.V.B.)

Eye Accommodation

"What a wonderful world this would be if people were as willing to be accommodating as their eyes are. Ever think of that, Mr. Samuels?

"No more balking. No more stubbornness. Always, 'I'll try', never, 'I won't'. Your eyes are always trying to do what you want them to. Accommodating, that's what they are.

"Let me show you. Here, put this light meter on your desk. What does it read? 15 ft-c. Now set it on the window sill—200 ft-c. When you moved from your desk to the window your eyes accommodated themselves to that big difference in light. Except when you're asleep they're doing that all the time.

"They can do a terrific lot of accommodating, but there is a limit. Beyond that limit come headache and temporary impairment of vision, which will become permanent, finally.

"We can't eliminate the necessity for eye accommodation. But we can reduce it with planned lighting." (P.K.)

Dark by Comparison

"You didn't realize it at the time, and neither did I, that when I sold Planned Office Lighting to a number of your tenants you were buying some Planned Lighting, too. That is, I hope you will agree with me that you were. I think you will when you hear my story.

"I've been making back calls on those tenants, Mr. Braymer, checking on how they like their new lighting. They are all pleased with it and its results, pleased also with the cooperation they received from you as manager of the building. In short, they are pleased all around, except for one thing.

"The thing that bothers them is the lighting of the corridors of the building. After their offices, the corridors seem pretty dark and gloomy.

"The present lights in the hallways are fairly close together. I think you could replace them with fluorescent at very low cost. Then with no increase in your electric bill you'd get about twice as much light. Then the tenants in offices not yet relighted would see the contrast and want Planned Lighting in their places. More planned lighting will further increase the value of the building at no expense to you since the tenants are paying for the new installations." (R.L.)

Selling Planned Factory Lighting

IN THE MINDS of most factory operators the first use of electricity is for power to drive the machines. This is right. But too often the factory operator neglects to give sufficient consideration to the second important use of electricity—for lighting. He fails to appreciate that, while electricity for power is necessary to keep his machines running, electricity for proper lighting is necessary to make them run profitably, or more profitably.

Your job as a lighting salesman is to prove this to the prospect. Since instant example is always more convincing than bare assertion, you should not rely on simple statement of the advantages of Planned Lighting to prove your case. Instead, you should try to find in the conditions of his business and in his establishment opportunities for realization of the benefits of Planned Lighting that he will immediately recognize as much.

Look for instances of spoilage and of rejects that can be attributed to improper lighting.

Look for evidences of eye fatigue among workers and point them out to the prospect.

Look for indications of low morale as appearing in grumpy men with little interest in their work.

Look for unsafe conditions whose danger would be more apparent under Planned Lighting.

Look for evidences of sloppy housekeeping that interfere with production and is a hazard to safety.

Look for glare, dark shadows and excessive contrasts of illumination that produce eyestrain that reduce worker efficiency.

Look for older workers who apparently are not keeping up with younger men around them.

Look for foremen who apparently can't see clearly what is going on in the areas under their supervision.

Look for inefficient placing of machines caused by improper lighting.

Look for these and any other conditions disadvantageous to maximum production so that you can show the prospect the benefits of Planned Lighting in specific terms of his own operations.

As in selling store lighting, you should prepare yourself for the call by checking up on the prospect's bills so that you can figure out his average rate and show him the increment cost of electricity for adequate Planned Lighting.

Also check on any previous planned lighting sales approaches—direct mail and calls—made to the prospect. This knowledge will be helpful in opening the interview.

And, naturally, you will be prepared with pictures of installations comparable to the one you recommend, letters and articles proving benefits obtained—all the sales ammunition available to you.

Scrap Iron

"You know, Mr. Blair, I like to visit a shop like yours. This business was started by your grandfather, wasn't it? Over 75 years ago, I hear. Sort of gives me a feeling of solidity and permanence in these days when the world is going every which way. The old gentleman must have given his lifetime to building a reputation for quality and value into the firm name. And it's obvious your father and you never let that reputation slip. Otherwise you wouldn't have such a profitable business.

"I think I can show you how to make it more profitable. Planned Lighting.

"Oh, you know all about it? Read our mailing pieces, eh? Then I don't have to sell it to you. But you don't want to lay out a lot of money on improvement so soon after buying that new gear cutter? Say, that's a beautiful machine. Sure must have cost plenty. Bet you had a time making room for it. That reminds me. We put Planned Lighting into a shop about this size over in Plymouth a few weeks ago. It gave the owner a new look at his place. He saw a lot of things he'd never been conscious of before—old machinery, parts and junk that had accumulated over the years. So he cleaned the place up and found he had 7 tons of scrap iron to sell. He got between $200 and $300 for it, which helped a lot to pay for the new lighting." (C.A.R.)

Wages and Hours

"I suppose you read about the agreement between General Motors and the UAW a while back. No strike, everybody happy and the production lines keep on turning out cars. Did you notice that the contract provides for an automatic increase in wages every year?

"That wasn't pure generosity on the part of GM, far

from it. It was just sensible recognition of a plain fact. Which is that new ideas, new methods, new machines coming along continually increase the productivity of human labor. And the wage earner is entitled to his share in that increase.

"That plain fact is also recognized in wage and hour legislaton. This means that industrial plant operators must use every available means to increase labor productivity. They usually think of new machines, new arrangements of facilities, new production methods, as their way out. But there is still another way to improve production efficiency—Planned Lighting. Let me give you evidence of what it can do . . ." (J.L.P.)

Roller Skates

"Oops! Here I go! No, still on my pins. Stepped on that round piece of steel there and it rolled under my foot. No, I'm all right. But a man could wrench his back that way. Maybe get one of those sacroiliac things.

"Don't let it bother you, Mr. Brown. Matter of fact, I was putting on an act. I stepped on that thing on purpose. I could just see it, lying there, and I thought I'd give you a demonstration of how such accidents happen.

"Now, Planned Lighting would protect against things like that in two ways. First, a man would see where he was putting his feet. And second, I know you'd see that the floor was kept clear of things to trip a man up if you noticed them. Which, of course, you would if you had Planned Lighting in here."

Light and Happiness

"Do you ever think about Heaven, Mr. Allen?

"Not a religious man, eh? Well, I'm not either. But I do remember Sunday school when I was a kid. So do you, I bet. The idea of Heaven we got in Sunday school was a place of light, light everywhere, and everybody happy. And Hell was the abode of darkness, lost souls suffering and groaning. Remember?

"Suppose we take that idea of light and happiness as against darkness and unhappiness and think of it in connection with this factory of yours. See what I'm getting at? More and better lighting—Planned Lighting —will help a lot to make your plant a happier place to work in. And you know that will pay off big in improved employee morale."

Machine Shop Argument

"What's going on over there? The boys seem to be having a little argument."

"Oh, nothing unusual. Once in a while even the best machinist, like Henry there, turns out a defective piece. The inspector finds it. Then he and the foreman and the machinist talk it over. Sometimes the talk is rather loud, like now."

"Well, I don't know anything much about the machinist's trade. I couldn't run Henry's machine if I had four more hands. But I can see something from here that's right in the center of that argument, and probably those lads shooting off their mouths don't even know it's there.

"That's the inspector's desk over there, isn't it? See how well lighted it is? No wonder he can see a defect that Henry overlooked. Mr. Thorpe, are you being quite fair to Henry? Compare the lighting on his machine with that on the inspector's desk. Now if you had Planned Lighting in this shop, I'm sure there would be a lot fewer arguments like that wasting time that could be used in production." (R.L.)

Skill of Old Hands

"I see you have quite a few oldtimers here, Mr. Wright. They must know their work thoroughly. Their skill and experience must be worth a lot to you."

"Yes, they're all my friends. That's what makes it tough on them and on me too. They have plenty of know-how, but they can't seem to keep up with the younger fellows. I've had to put some of them on less important work. They don't like that and neither do I. But the cost sheet tells me I have to do it."

"Did you ever stop to think, Mr. Wright, that older men don't see as fast as younger ones? Maybe that's a large part of the reason for their slowing up. Quantity and quality of light are a big factor in speed of seeing. Give these oldtimers plenty of light—Planned Lighting —and I bet most of them will be able to keep up because they'll see faster."

Selling Planned School Lighting

IN SELLING planned school lighting you have a much tougher row to hoe than do store or office lighting salesmen. In all but the largest stores or offices, it is usually necessary to sell only one man on the idea of better light.

In school lighting, the situation is usually very different. Many fingers enter into the pie here. And every school lighting job will very likely present a different problem for you to solve, on the very simple and basic question—"Whom should I sell"?

In no other type of lighting sales is it so important, and necessary, for you to look around, to "case the joint," in order to find the right person to sell.

Sometimes the school superintendent or administrator really runs the individual school or district. Sometimes the school board insists on making all major decisions. Sometimes the chairman—or chairwoman—of the local PTA, through sheer force of personality, will be the dominating figure in any improvement program.

Discreet investigation into the question of just who has the final word will pay you big dividends, and prevent waste of your time.

Look into the PTA carefully. You may well find unexpected allies here—employees of your own company, contractors, etc, who are apt to be familiar with the need for adequate light in schools, and who will be eager to help you.

In every group of people, in every PTA, there is at least one leader, one "sparkplug." Find this person, give him a convincing story, give him the ammunition, and he will take much of the burden off your shoulders. He will suggest that the school lighting film, "Educating In A Truer Light," be shown at the PTA meeting. He will urge that a light meter survey be made, and follow through with a detailed plan.

Many PTA's have actually gone out and raised money for school lighting improvements themselves, when the school's financial resources were not sufficient. Personal solicitation among parents of children attending the school, plays, voluntary assessments of PTA members, card parties, and many other types of fund-raising projects have been used.

The support of the teachers, too, can be most helpful. If you know a teacher in the school you are trying to sell, take him to see a good school lighting installation. Let him see the difference, and spread the story among fellow teachers. It will reach the principal and administrator.

Civic groups—Lions Clubs, Rotary, Kiwanis, and others—are often very much interested in better light for classrooms. Again, you are likely to find members of these groups in your own company or the local electrical industry. (J.H.R.)

Get the Money

"I know, Mr. Lewis, that you want every classroom in the city to have Planned Lighting, that you appreciate its value in conserving the vision of children. I know also that you have done your best as superintendent of schools to sell the need for modern classroom lighting to the school board. And the board says the voters won't stand for another school bond issue so soon after that one last year for those two new schools.

"That seems to land us smack up against a stone wall. But there is a way over the wall or around it. It is for the voters to tell the school board they will stand for a bond issue to protect their children's eyes. What we have to do is sell the need for Planned Lighting to the voters. And I have an idea how to do it. I think it should work.

"There is dimmer equipment on the lighting in the new hotel dining room where the Rotary, Kiwanis, Lions and other civic clubs hold their regular luncheons. I'll get dates to talk to all of them. Each time I'll pass around facsimile pages of a third-grade reader. With the lighting all on in the dining room and the window-curtains closed, the average intensity should be up to about 25 ft-c. I'll check beforehand and see. If it is not, then I'll put in a few larger lamps to bring it up. Then I'll tell them that for good seeing, school children should have at least 50 ft-c, twice as much as in the dining room and as there is in the average classroom near a window on a cloudy day. Then I'll dim the lighting down to 3 ft-c and ask them to read the page under that intensity which is that on the desks of children farthest from the windows.

"I'll take off my glasses and hold them up and ask the audience to do likewise. I'm sure from what I've learned since, that I'm wearing glasses today because of the lack of good lighting in schools when I was a kid. And I'll ask the folks to remember the gloomy classrooms of their school days and tell them that their glasses are probably the result of the poor school lighting they were subjected to.

"I'll give the same demonstration to PTA's, to any and all organizations I can. This will give to a great many influential citizens a personal appreciation of the poor classroom lighting that is impairing the vision of their children. And I don't think it will be long before they convince the school board that a bond issue to improve the lighting in all our schools will be approved by the voters."

Students Boil Over

"Did you read in the papers about those riots of high school students in New York? Trying to pressure the authorities into raising teachers' pay. Teachers said they'd been promised a raise and didn't get it. So they said, 'All right, we'll teach school and that's it. No more extracurricular activities after school hours like parties, discussion groups, trips and that kind of thing.' The kids didn't like that, so they put on mob demonstrations.

"I don't know what the New York schools are like, but I don't imagine they're any better than ours here. If that's the case then the New York teachers have some sympathy from me. They are probably working in classrooms like ours, not lighted properly. That makes the teacher's job harder than is necessary. At their age, school kids have a natural tendency to squirm and act up sometimes. Poor lighting in classrooms makes them worse and that puts more of a strain on the teachers. They have enough problems without the added ones caused by poor lighting. What do you think?"

Not TV's Fault

"On my way to see you, Dr. Rossiter, I took a look at your school library. Used to like books just as books when I was in school. You know, part-time librarian's job and a merit badge in bookbinding from the Boy Scouts. You've got a fine lot of books and reading material, I'd say. From that standpoint, your library should be an attractive place.

"I got talking to your librarian about things, and she told me that only 2/3 as many children used the room this year as did ten years ago. The poor girl can't figure it out. She wondered if it was TV's fault or a lack of service at the library, or a real drop in student interest. I took one look at that room, Dr. Rossiter, and I knew that the trouble is right above her head. It's the lighting. It's pretty bad. Come down there with me and I'll show you what I think Planned Lighting can do for that place."

Important Woman

"Good morning, Mrs. Smythe-Smythe. Let me introduce myself. I'm Frank Turner of the Reddy Electric Light Co.

"You are chairman of the Parent Teacher Association of the Bradley school, I believe. I suppose then your children attend that school. What, only one child? Your son, Seymour? I'm sure he is a bright boy, with such a mother.

"You don't tell me. Wasn't passed into the third grade? There certainly must be something wrong somewhere. There's one condition I know of that doesn't help him learn. That's poor lighting in the classrooms. That's the reason for my call today.

"We have just received a sound-slide film from the Better Light-Better Sight Bureau. 'Educating in a Truer Light' is its title. I'd like to show it to your PTA group.

"Could you and the other ladies come to the demonstration room in the company office at 3 o'clock next Thursday afternoon? Good. I'll get our home economist to serve coffee and doughnuts while we talk things over after the film is shown."

Struck with an Idea

"At noon today I was walking down Broad Street past the school where you are principal when a ball socked me on the hip. I flared up a little and asked the youngster why he wasn't in school at his lunch instead of out bean-balling passersby.

"'Why should I eat lunch in that place' he countered. 'It's a mess,' he added, and some of his friends nodded their heads in agreement.

"That made me think. I've been telling you about the benefits of planned classroom lighting. Maybe I ought to talk about its benefits in other places, too. So I dropped over to the school lunchroom to have a look at it. The answer to the kids' dislike of the place was not in any lack of cleanliness or order. It was spotless and the food looked well prepared. But the tables were so poorly lighted I don't think you could tell a tablespoon from a teaspoon. The murkiness didn't help the looks of the food, either. Planned Lighting would make the place more attractive to the children and probably also reduce the impatience coeffecient of the people working there."

PL-PL Gets New Dress

THE PLANNED LIGHTING PROGRAM is being refurbished. New sales promotion pieces and educational material are now being prepared and will be ready in September. The new pieces are the results of three years' experience in promoting Planned Lighting. Some of them are improvements on, and will replace, existing pieces. Others are entirely new, designed to fill up gaps that become apparent as the program got into action in its original form. The illustration here, showing some of the pieces completed and others in various stages of production, gives an idea of how completely the program is being rejuvenated.

Of especial note in the material being prepared is a new form which serves both as recommendation and layout to be given the customer and as complete record to be retained and turned in by the salesman.

For the store lighting market, the new material will present a series of five hard-hitting direct-mail pieces, backed up by a completely new booklet. These talk the store owner's language from start to finish, and provide the needed tools for "The Men Who Plan" in the commercial lighting market.

Office lighting comes into its own with another completely new fact-packed booklet and a series of three mailing pieces. Those who have followed the development progress of the office booklet and mailers believe that commercial managers and lighting salesmen everywhere will be pleased by the color and impact of these materials.

Similarly, in industrial lighting, the utility and its sales force will find the way paved by a group of four mailing pieces and a 16-page booklet. This section of the revivified Planned Lighting Program promises to bring even better results than the notably successful industrial items previously produced.

Interest in school lighting is at its peak today throughout the country, in large communities and small. New materials of two types are being provided: booklets for school authorities presenting up-to-date information on classroom lighting; and folders for distribution to the public on basic "Science of Seeing" and classroom lighting ideas.

Among the new items for the residential market, sales managers will find no less than eight folders aimed at special home lighting needs—all packed with useful information for consumers. They range from lighting for sewing, kitchens, and decoration to basic lighting for safety in the home and a complete presentation of all types of CLM lamps and approved fixtures.

This versatile and compelling new program will be produced in more attractive form than was possible three years ago, when shortages in paper and printing facilities were still in effect. The materials will be as light and bright as the fine planned illumination they will present to the public. Sample distribution of the program, field by field, will be made soon. (P.W.K.)

ANGLE POINTS on proposed transmission right-of-way are marked by dropping 10-lb bags of lime on bare ground and weighted flags where ground is covered with brush

Helicopter Ideal For Preliminary Line Location

Reduces time of preliminary ground surveys to hours; makes it easier to get on-the-spot advice from right-of-way and construction men and other specialists

HELICOPTER reconnaissance can cut substantially the time normally required for selection of the best transmission line right-of-way. Southern California Edison has found that the helicopter can be used advantageously over rugged terrain as well as over congested industrial and residential areas.

Actually, helicopter reconnaissance permits a two-fold saving. First, ground can be covered and all feasible routes explored quickly. Second, since an aerial survey requires hours rather than weeks, it can be accomplished by an engineer thoroughly experienced in locating transmission lines in rough or congested terrain.

Location Procedure . . . First step is to select from topographic maps or aerial photographs several tentative routes between terminals or intermediate control points on the desired line. Second step is to fly a scaled map course at low altitudes to determine angle points. Then at higher altitudes the ship is lined up with angle points, and landmarks along the tangents fixed in mind. This permits a later detailed examination from the air of the entire alignment. When the best line has been selected, bags of lime are dropped on open ground, or weighted flags in bushy areas, to locate angle points and define the line for surveying crews.

Viewing an area from helicopter is similar to seeing an aerial photograph through a stereoscope, but with these advantageous exceptions: Clarity is better, field of vision is unlimited and scale can be changed at will. Also, reconnaissance can be made at standstill or up to 70 mph regardless of rough terrain, dense brush, property restrictions or other obstacles.

Typical Surveys . . . Value of helicopter reconnaissance is illustrated by two typical surveys reported by Jordan Lummis, Southern California Edison transmission engineer, who has done much to develop this application. One case required location of 30 miles of 220-kv line across some of the most rugged, primitive, and heavily-brushed land in southern California. Excellent topographic maps were available, but they were too old to show recent road additions. However, a tentative route was selected from these topographic maps and examined by helicopter. Twenty-three miles of the route were adopted with only minor deviations. Seven miles of the route traversed an area without any existing access, in which area road construction would have been most difficult.

Therefore, the surrounding area was viewed from a high altitude and a more circuitous route following existing roads was provisionally selected. Estimates of both routes were later compared on the basis of notes taken during detailed low-altitude examination of the longer route. After the selected route was marked by dropping lime and weighted flags, it was shown to the survey chief, construction supervisor and to the right-of-way buyer.

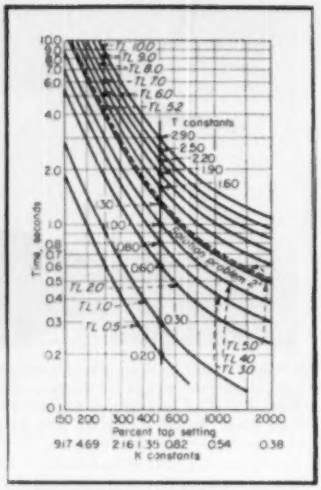
Flying time for the entire operation was 16 hr, whereas just driving through the area requires 8 hr, and, at some points, brings the observer to locations more than 5 miles distant from the line. It is estimated that the helicopter saved at least 6 weeks of very difficult ground work.

Another typical survey was the locating of 10 miles of 220-kv line through residential and industrial areas. The two routes possible lay along stream channels most lightly settled. The problem was to select the most economical and least hazardous combination of the two routes. With no roads paralleling the channels, reconnaissance by foot proved to be the only possible alternative to helicopter survey.

However, foot reconnaissance requires walking down one bank until stopped by an obstruction, then swinging to the other bank, if clear, and continuing to the next obstruction. If both banks are blocked, the obstacles are investigated and one or the other forced. It is also necessary to investigate adjacent areas by automobile for air fields or sources of serious air contamination.

Helicopter reconnaissance at 200 ft (minimum flight altitude of helicopters is not restricted by law) provided an excellent view of both banks for a quarter mile in all directions. Sizes of obstacles and the better bank were quickly determined. At 1,000 ft, adjacent areas were easily surveyed for a mile in all directions, even during hazy weather. Less than 6 hr were spent in reconnaissance.

SETTINGS to be applied to overcurrent relays can be determined quickly in the field by aid of tables carried in testman's notebook. The condensed tables of timing points have been prepared from manufacturers' calibration curves furnished with the various types of relays. Each of these timing points, for different types of relays, is shown in Tables I and II



CALIBRATION curves for IAC-53 relay show principles underlying development of simplified methods for determining settings. TL 5.2 curve is solution for Problem 2

How to Calculate Relay Settings In the Field

New condensed relay tables, used in conjunction with corresponding constants, obviates reference to manufacturers' calibration curves.

CHARLES L. BETTS, JR, Electrical Engineering Dept
Long Island Lighting Co, Mineola, N. Y.

A SIMPLIFIED METHOD to determine settings for induction type overcurrent relays now makes it possible to construct in the field, if necessary, a relay performance curve for any multiple of tap setting or time lever position. The procedure is based on a set of constants that have been developed for use with new condensed timing tables. Advantages of this method are:

1. Compact tables which are easy to reproduce and convenient to carry for use in the field.

2. Timing points that can be calculated quickly and accurately simply by using these tables and a slide rule.

3. Time lever positions that can be determined precisely for making rapid changes in the field whenever there may be insufficient outage time to run a complete performance curve.

4. Better understanding and cooperation between various departments handling the determination of relay settings for selective operations and their application in the field. This results in standardization and improved relay coordination throughout the system.

The condensed tables of timing points have been prepared from manufacturers' calibration curves furnished with the various types of relays. These new tables give timing points corresponding to time lever (TL) positions of 0.5, 1.0, 2.0, 3.0 to 10.0, which have been established for a value of 500% tap setting. Each of these timing points, corresponding to the different types of relays, is shown in the "Timing Points" tables.

The time of the relay at a value of 500% tap setting has been chosen as the reference point for each type of relay. For this reason, therefore, it has arbitrarily been given a "K" constant value of unity (1.00). Operating time of the relay for every other multiple of tap setting can be computed by multiplying the time value at this reference point by the various "K" constants given in the table. "K" constants for intermediate multiples of tap setting, as well as "Timing Points" for intermediate time lever positions, can easily be found by interpolation.

"Timing Points" and "K" constants

TABLE I—Timing Points and "K" Constants for Five G E Relays

(Referred to 500% Tap Setting as a Base)

TL	IA-201	IAC-11	IAC-51	IAC-15	IAC-53
	"Timing Points," Sec				
0.5	0.35	0.30	0.25	0.30	0.20
1.0	0.40	0.50	0.40	0.45	0.30
2.0	0.60	0.90	0.70	0.70	0.60
3.0	0.90	1.30	1.10	0.95	0.80
4.0	1.20	1.70	1.40	1.20	1.00
5.0	1.50	2.00	1.80	1.45	1.30
6.0	1.90	2.40	2.20	1.70	1.60
7.0	2.30	2.80	2.60	1.95	1.90
8.0	2.70	3.20	3.00	2.20	2.20
9.0	3.30	3.60	3.50	2.45	2.50
10.0	4.00	4.00	4.00	2.70	2.90
% Tap Setting	"K" constants				
150	2.98	2.71	2.98	9.11	9.17
200	1.96	2.00	1.94	5.06	4.69
250	1.58	1.61	1.59	3.16	2.98
300	1.37	1.39	1.38	2.22	2.16
400	1.12	1.14	1.15	1.36	1.35
500	1.00	1.00	1.00	1.00	1.00
600	0.92	0.92	0.92	0.83	0.82
800	0.82	0.80	0.81	0.66	0.63
1,000	0.74	0.73	0.74	0.58	0.54
2,000	0.53	0.62	0.59	0.42	0.38

TABLE II—Timing Points and "K" Constants for Five Westinghouse CO Relays

(Referred to 500% Tap Setting as a Base)

TL	Low Energy			Stan'd. Energy
	Inverse	Very Inverse	Definite	Definite
	"Timing Points," Sec			
0.5	0.30	0.20	0.40	0.15
1.0	0.50	0.40	0.60	0.20
2.0	1.00	0.70	0.80	0.40
3.0	1.40	0.90	1.20	0.60
4.0	1.80	1.20	1.50	0.80
5.0	2.20	1.50	1.80	1.00
6.0	2.70	1.80	2.00	1.30
7.0	3.10	2.00	2.50	1.60
8.0	3.50	2.30	2.90	1.90
9.0	4.00	2.60	....	2.20
10.0	4.50	2.90	....	2.40
11.0	4.90	3.20	....	2.70
% Tap Setting	"K" constants			
150	12.05	10.68	7.75	2.48
200	5.36	5.50	4.00	1.74
250	3.32	3.58	2.64	1.44
300	2.36	2.50	1.99	1.27
400	1.39	1.44	1.28	1.09
500	1.00	1.00	1.00	1.00
600	0.83	0.83	0.83	0.94
800	0.68	0.59	0.68	0.88
1,000	0.58	0.51	0.60	0.85
2,000	0.42	0.35	....	0.85

TABLE III—Performance Curve of IAC-51 Relay

% Tap Setting	"K" constant from Table I	Timing Point, Sec @ TL 2.0
150	2.98	2.80
200	1.94	1.82
250	1.59	1.49
300	1.38	1.30
400	1.15	1.08
500	1.00	0.94
600	0.92	0.87
800	0.81	0.75
1,000	0.74	0.70
2,000	0.59	0.56

TABLE IV—Performance Curve for IAC-53 Relay

% Tap Setting	"K" constant from Table I	Timing Point, Sec @ TL 5.2
150	9.17	12.10
200	4.69	6.19
250	2.98	3.94
300	2.16	2.85
400	1.35	1.78
440	1.21	1.60
500	1.00	1.32
600	0.82	1.08
800	0.63	0.832
1,000	0.54	0.714
2,000	0.38	0.501

for various types of overcurrent relays manufactured by the General Electric Co are given in Table I; those for various types of overcurrent relays manufactured by the Westinghouse Electric Corp are given in Table II.

In applying these tables to determine particular relay performance curves the procedure is illustrated by two typical problems.

Problem 1 — Determine the performance curve (or timing points) for calibrating an IAC-51 General Electric relay set on time lever (TL) position 2.6.

Solution — From timing table for ICA-51 relay: TL 3.0 = 1.10 sec; TL 2.0 = 0.70; Diff = 0.40 sec.

By interpolation the timing point at TL 2.6 will be that at TL 2.0 (0.70 sec) plus (0.6 x 0.40 = 0.240 sec) or 0.940 sec. But 0.940 sec is referred to the timing point at 500% tap setting which represents the reference point from which all other timing points are to be calculated. To find these timing points at other multiples of tap setting, the "K" constants to be used are given in the "K" constants table in the column for the IAC-51 relay.

For example, to find the timing point at 150% tap setting, multiply 0.940 sec (the time of 500% tap setting) by the "K" constant corresponding to the 150% tap setting, namely, 2.98. The result is a timing point of 0.940 x 2.98 or 2.80. Timing points corresponding to 200%, 250%, 300%, 400%, 500%, 600%, 800%, 1,000% and 2,000% tap setting are found in like manner by multiplying 0.940 sec (the reference timing point) by the corresponding "K" constants, namely 1.94, 1.59, 1.38, 1.15, 1.00, 0.92, 0.81, 0.74 and 0.59 respectively.

For convenience in plotting the resulting relay calibration curve corresponding to TL 2.6, it is recommended that the above calculations be set in tabular form, as shown in Table III.

Problem 2 — Find timing points and determine time lever (TL) position for use in calibrating an IAC-53 General Electric relay to be set to time out in 1.60 sec at 440% tap setting.

Solution — From the "K" constants table for IAC-53 relay:

K at 400% tap setting = 1.35
K at 500% tap setting = 1.00
Difference = 0.35

By interpolation the "K" constant corresponding to 440% will be the "K" constant for 400% tap setting (1.35) minus the actual difference (40% x 0.35 = 0.14 or 1.21.

But the relay must time out in 1.60 sec at 440% tap setting. Knowing that the "K" constant for 500% tap setting (referred to as a base) is always unity (1.00) and that the "K" constant just calculated for 440% tap setting is 1.21, the timing point at 500% tap setting will be $\frac{1.00}{1.21}$ x 1.60 = 1.32 sec

The determination of timing points corresponding to other multiples of tap setting (150%, 200%, 250%, 300%, 400%, 600%, 800%, 1,000% and 2,000%) can be computed in the same manner as described in the solution of the first problem.

The time lever (TL) position, which will correspond to these timing points can be found as follows. Referring to the timing table for the IAC-53 relay, 1.32 sec falls between TL 5.0 and TL 6.0, viz; TL 6.0 = 1.60 sec; TL 5.0 = 1.30 sec; Diff = 0.30 sec.

From inspection it can be seen that the TL corresponding to 1.32 sec. will be: TL (?) = 1.32; TL 5.0 = 1.300; Diff = 0.02 sec.

This will be equivlent to an increase in TL position of

$$\frac{0.02}{0.300} = 0.067 \text{ of one division.}$$

Therefore, the TL position corresponding to 1.60 sec at 440% tap setting will be 5.0 plus 0.067, or TL 5.067. For all practical purposes the relay may be set at TL 5.1.

For convenience in plotting the resulting relay curve, this calculated data should be put in tabular form as shown in Table IV.

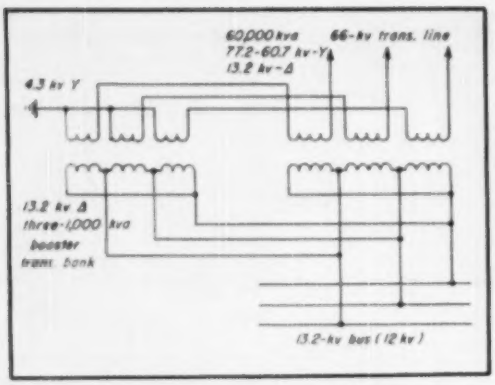


FIG 1—**BOOSTER CONNECTIONS** for delivering 12 kv to system

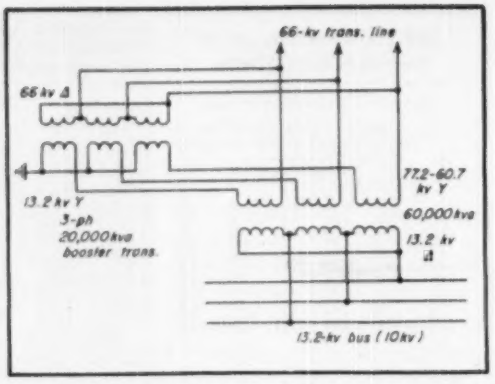


FIG 2—**BOOSTER CONNECTIONS** for delivering 10 kv to system

Temporary Repairs Salvage 75% Of Generator Rating

Reconnected generator, placed in service 11 days after second failure, yields 75% normal output

D. W. DEWEY, Asst Supt of Substations, Cincinnati Gas & Electric Co

WHEN FAILURES occurred in the stator winding of a 23-year old generator, the faulted coils were disconnected and the generator was operated at reduced voltage thereby salvaging three-fourths normal output for six months while new coils were being secured. The low voltage output was delivered to the system by the addition of booster transformers.

The winding of the 47,360-kva, 13.2-kv machine is 5/7 pitch, with seven coils in series and four series groups in parallel per phase, making a total of 84 coils. On the first failure, 12 of the 84 coils, including the defective coil, were cut out of the winding and insulated at both ends. Within four days the machine was restored to service with a temporary rating of 12,000 v maximum, 38,000 kw, and 95% power factor.

Since all of the power generated at the station where the failure occurred, is transmitted into the system over high voltage transmission lines, it was possible to feed the output of this unit at its reduced voltage, directly into a 60,000-kva, 13.2/66-kv transformer bank that had a maximum ratio of 13.2/77.2 kv. Also, since the high voltage side of this transformer bank was tied directly to an overhead transmission line of 60,000 kva capacity, the generator output was transmitted 24 miles to another station before connecting with the rest of the system.

But because of this transmission distance the repaired generator could not be loaded with the desired reactive power.

The high-voltage side of the 60,000-kva transformer bank, to which the repaired generator was connected, is wye connected and grounded through a 30-ohm resistor. To boost the sending voltage of this transformer bank, a 3,000-kva, 13.2/4.3-kv bosting transformer bank (connected for a ratio of 11,880/4.3 kv) was substituted for the resistor. The high-voltage side of the boosting transformer was connected to the low-voltage terminals of the main transformer bank and the low-voltage side was connected to the neutral terminals of the main transformer bank, as shown in Fig 1. Resultant maximum voltage at no load was 74,550 v, and the machine could be loaded to its full temporary rating.

Two months later, a second coil failed in the same series group of coils in which the first failure occurred. Therefore, twelve more coils, (one from each series group) including the faulted coil were disconnected and insulated at both ends. Operating with only five coils per series group, the machine was given a rating of 10,000 v maximum, 33,500 kw, and 96% power factor.

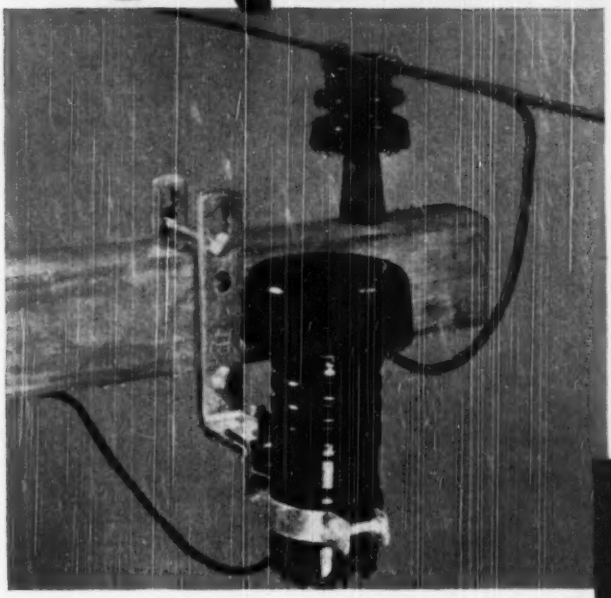
Since the 3,000-kva booster transformer bank was not big enough, a spare 20,000-kva, 3-ph, 66/13.2-kv transformer substituted to get the 10-kv output into the system.

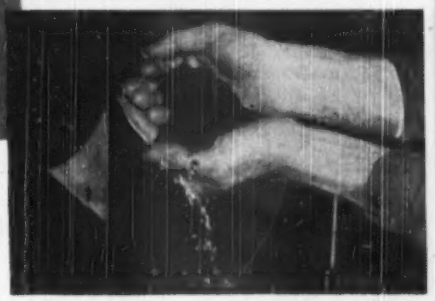
The 66-kv windings were connected in delta and the 13.2-kv windings were connected in wye. Energizing its 66-kv windings from the high-voltage terminals of the main transformer bank and inserting the 13.2-kv windings in the neutral of the main transformer bank let it act as a booster, as shown in Fig 2.

Moisture

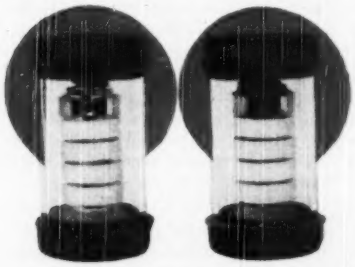
doesn't hurt this arrester

The General Electric Pellet Arrester has a unique valve element that is unaffected by service moisture—and gap electrodes that are sealed in dry nitrogen (N_2)—exclusive features that mean more enduring protection against lightning.





Valve Element Unaffected by Service Moisture! Efficient valve element is a column of lead peroxide pellets—pellets which are actually formed *with water* in a tumbling barrel (right). Moisture in service causes no change whatever in the unexcelled protective characteristics of this pellet valve column.



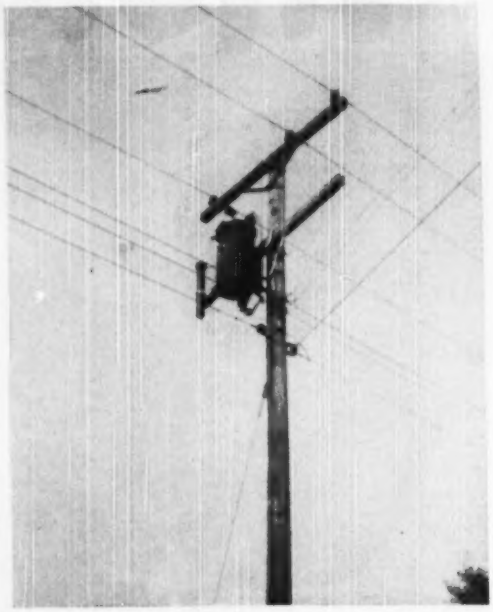
N_2-filled Gap Excludes Corrosive Moisture! Here's life-test proof: electrodes at left were sealed in *dry nitrogen*—those at right sealed in *air*, and both exposed outdoors under maximum rated voltage. Result: N_2-protected gaps are bright and clean; gaps sealed in air are discolored and corroded.

In addition, pellet arresters use inorganic insulation throughout—no internal fiber to "track," carbonize or wear away. Whether valve- or expulsion-type, *no other distribution arrester is so unaffected by service moisture.* Write for Bulletin GEA-2975. *Apparatus Dept., General Electric Company, Schenectady 5, N. Y.*

GENERAL ELECTRIC

HOW TO DESIGN • CONSTRUCT OPERATE • MAINTAIN

BEFORE CONVERSION—3-ph, 11-kv delta line of No. 2 copper conductor, conventional transformer. This installation was typical of Tide Water Power Co's circuit from Whiteville to Tabor City, N. C.



AFTER CONVERSION from 11-kv to 19-kv wye, showing typical assembly-pole ground, guy, secondary neutral and one primary lead of transformer connected to line neutral (top wire in secondary position)

Conversion to 19-Kv Wye from 11-Kv Delta Improves Operation

JACK A. WRIGHT
Electrical Engineer
Tide Water Power Co
Wilmington, N. C.

Conversion of a 17-mile, 3-ph, 11-kv delta circuit to 19-kv wye by Tide Water Power Co, without changing to higher classification distribution transformers, has been highly successful. Since this conversion, there have been fewer transformers damaged by lightning, although the lightning season has been normal; regulation has improved; radio noise along the line is nil; and no telephone trouble has been experienced. Tide Water is going ahead with plans to convert an additional 60 miles of 11-kv to 19-kv wye on other locations in view of these results.

The line selected for the first conversion was a circuit of No. 2 copper from Whiteville to Tabor City. The line is fed from three 500-kva transformers which were connected 33-kv delta on the high side and 11-kv delta on the low. At Tabor, a bank of three 200-kva transformers, connected 11-kv delta on the high side and 4,160-v wye on the low, supplied distribution within the town. Between Whiteville and Tabor, some 40 transformers 11,000—120/240 v supplied lighting and single-phase power for customers on the main line and on single-phase extensions.

Realizing that one of the greatest dangers from 60-c stress was in neutral shift, every effort was made to stabilize the phase-to-ground potential. Also, upon cutting over to 19-kv, the Tabor Bank would be wye-wye; so third harmonics had to be corralled. With this in mind, neutral wire the same size as the line conductor was strung the entire length of the line. At both Whiteville and Tabor, the neutral was tied in with the neutral grid on the 4,160-v distribution in the two towns. Every down guy was connected to the neutral, as well as every transformer ground and every pole ground. In addition to these precautions, a ground rod was driven one span away on each side of every transformer, and No. 6 ground wire brought from the rods up the respective poles to the neutral.

All CSP arrester gaps were re-

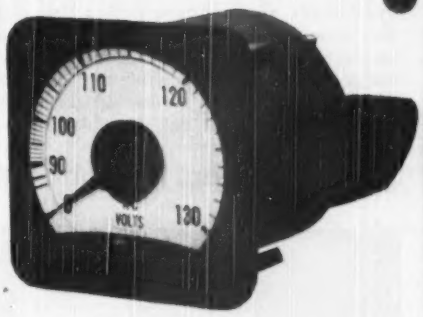
for more accurate readings we *STRETCHED* the scale

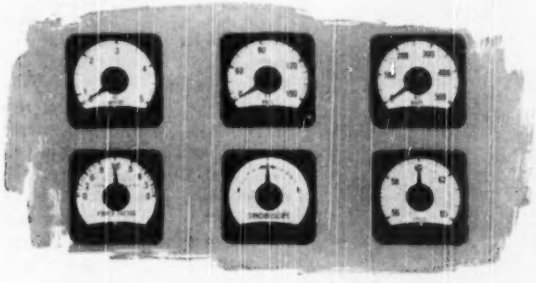
EXPANDED-SCALE VOLTMETER

Now you can read important circuit voltages more accurately! Most common voltages measured in generating stations, substations, or industrial test installations range from 105 to 125 volts. On the G-E expanded-scale voltmeter, the scale has been expanded—stretched out—over this 105- to 125-volt range.

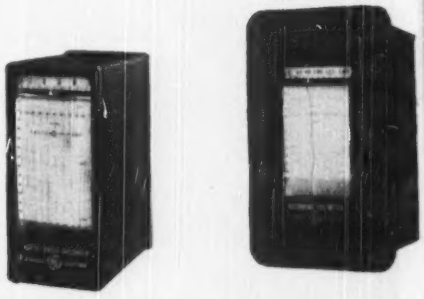
Thus accuracy within ½ of 1 per cent is obtained in the most used range. Over the remainder of the scale, accuracy is within 1 per cent. Because of high operating torque, response time is very fast, too—less than one second for full-scale deflection.

For modern switchboards, specify modern G-E switchboard instruments. Apparatus Dept., General Electric Company, Schenectady 5, N. Y.





The expanded-scale voltmeter is but one of G.E.'s line of long-scale instruments. These instruments are compact—five can be mounted on a 25-inch panel. Yet the long scale gives them a high score on readability. An instrument only 4¼ inches square has a scale 7.1 inches long.



Type CD recorders give permanent records of circuit conditions. Designed for switchboard installation, CD recorders can be mounted close together for space economy and appearance. Available in ink or inkless types.

GENERAL ELECTRIC

placed by single pellet type line arresters on the ultimate hot leg of each transformer and a drop-out cutout added. Transformers manufactured before 1930 were replaced by new ones of the same rating. No other change in distribution transformers was made.

The only insulators replaced were on a piece of line which had substandard insulators rated for normal line potential of 10 kv. These were replaced with standard insulators rated at 15 kv.

Conversion consisted of grounding one corner of the 11-kv delta and shifting all load from the grounded phase to the new neutral wire. On transformers and extensions which were across both hot conductors, one leg was transferred to the neutral. An outage was taken for connecting the Whiteville bank wye on the low side and the Tabor bank wye on the high side. Afterwards, load was balanced in accordance with prescribed phase assignments.

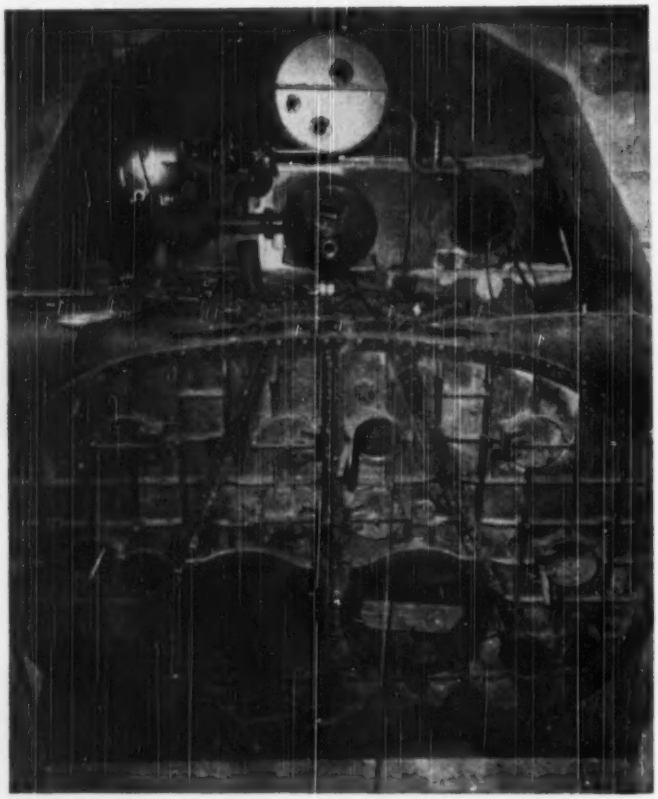
The first night after the load had been shifted to the two hot legs of the grounded delta, with return on the neutral, the Tabor telephone circuit across the road from the power line picked up a ruinuous inductive noise. This was remedied by telephone engineers, who installed filters on their circuit. They believed there would have been no trouble from the unbalance had their circuits been transposed and filtered in a standard manner. Since cutting over to wye, we have had no reports of trouble along that line.

The morning the line was energized at 19 kv, one arrester failed on a transformer some five or six miles from the Whiteville station. The arrester was evidently defective, as evidence of water was found within the arrester itself.

The 19-kv line has been through one lightning season. During that time, there was a loss of six 12-kv arresters. In each instance of failure, the arrester had exploded during severe lightning.

Only one transformer, a 3-kva CSP, has been lost to date. It was destroyed by a direct stroke of lightning, according to the customer it served. This low damage rate is astonishing, because, on the 11-kv line, it was unusual during the lightning season to remove less than three or four transformers damaged by lightning. Other lines in the Whiteville division have suffered the usual heavy transformer losses during this year's lightning season, indicating at least normal lightning trouble.

Stage Heaters in Condenser Throat Improve Turbine Economy



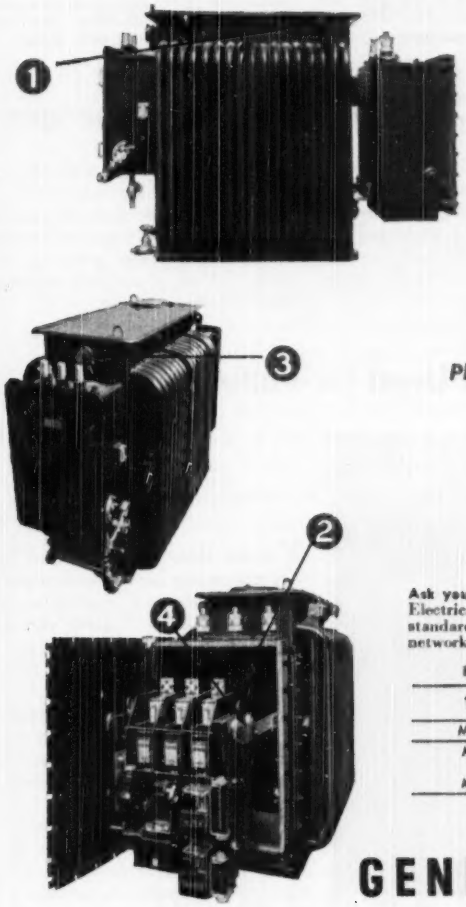
THREE HEATERS in condenser throat directly below turbine exhaust save space and serve to remove a great deal of moisture

TO IMPROVE the turbine economy, the Toledo Edison Co is using three stages of bleeding below the crossover point. These heaters are located in the throat of the condenser directly under the turbine exhaust. Since pressure drop to the heater is minimized, the maximum amount of heat can be extracted. Also, by installing this many stages at and below atmosphere, a large amount of moisture is removed mechanically from the turbine. The first installation of this nature, made by the company in 1947, showed about 1% better turbine efficiency than the manufacturer could account for. Inspection of blades 12 yr later shows very little blade erosion. This lack of blade erosion has proved to the company that the stage heaters in the condenser throat have a mechanical as well as a thermal advantage.

The distance between the operating floor and the turbine room basement is 28 ft. By setting the condensate pump adjacent to the condenser, the increased condenser dimensions were accommodated without major changes being made in the building floor levels.

YOU SAVE ON MAINTENANCE when you specify

Standardized Network Equipment



1 MAJOR GASKETS ARE ELIMINATED by welding, not bolting, transformer cover and switchbox to the main unit. Locating the tap changer behind a pipe plug eliminates a packing gland around an external shaft.

2 BUSHINGS can be removed externally, without opening the main transformer tank.

3 ALL TRANSFORMER ACCESSORIES—liquid-level gages, thermometer, tap changer, and all valves—are located at the high-voltage end of the transformer, easy to get to and check.

4 NETWORK PROTECTOR can be slid out on rails for quick inspection. Relays plug in—can be easily removed and replaced for checking.

PLUS **FASTER DELIVERY**—G-E standardized network transformers and protectors can be supplied on shorter delivery.

LOWER PRICE—G-E standardized network units are appreciably lower in price than non-standard designs.

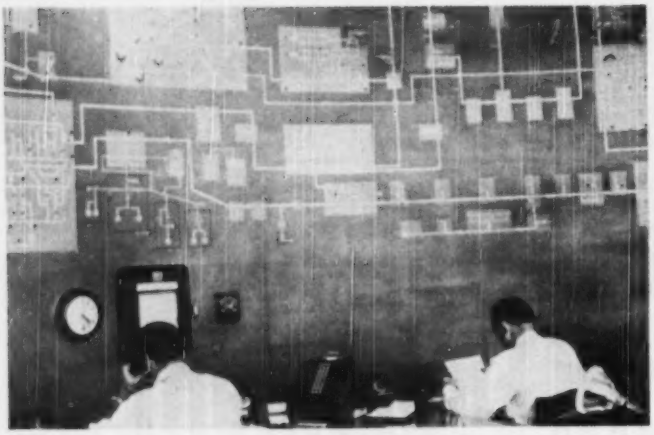
LOWER INSTALLATION COSTS—G-E standardized network units are designed for narrower, shallower vaults, saving substantially in vault-construction costs.

Ask your G-E representative or write to Apparatus Dept., General Electric Company, Schenectady 5, N. Y. for full information on standardized network equipment. Bulletin GEA-5024 describes network transformers; GEA-2017, network protectors.

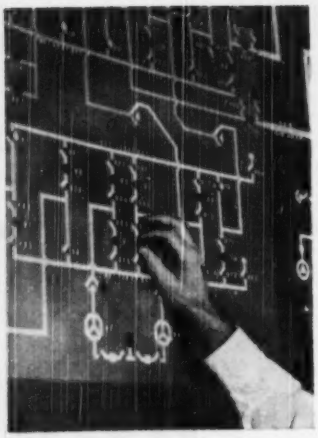
INCREASED Interrupting Ratings on Network Protectors

Type	Continuous Rating in Amperes	Interrupting Rating in Max. R.M.S. Amperes
MG-13	200 to 600	20,000
MG-8	800, 1200, 1600	30,000
or	2000	35,000
MG-9	2500 and 3000	60,000

GENERAL ELECTRIC



FLEXIBILITY is the word which describes this dispatcher's board of the Lower Colorado River Authority at Austin, Tex. Built of ⅛-in. welded steel, the board is dark green with switching stations, represented by a lighter green. Plastic tape of blue, silver, yellow and light green symbolizes lines and buses by voltages and may be rearranged easily



SYMBOLS to represent open or closed switches are ½-in. Alnico steel discs, painted green and red respectively. They eliminate drilling the board to make changes

Plastic Tape and Magnetized Disks Simplify Board Changes

PLASTIC TAPE and magnetized discs on a steel dispatching board at Austin, Tex., allow extreme flexibility in keeping up with system changes of the Lower Colorado River Authority. Plastic tape is of four different colors, representing lines of different voltages, and can be taken off and rearranged with minimum effort. Symbols for open and closed switches are ½-in Alnico steel, painted green and red respectively. They eliminate necessity of drilling the board to make changes in switch conditions.

The board is constructed of ⅛-in. welded steel and measures 21x13 ft on a 16-ft radius. Background color is dark green and all switching stations are painted a lighter green for contrast. Colored plastic tapes represent lines of different voltages.

Chain-Driven Cable Reel Used for Pulling Wire

STANDARD cable reel mounted on flat bottom truck and chain driven from power take off, facilitates pulling overhead wires by winding up bail line payed out along the pole line

F. R. WORTHINGTON
Instructor-Inspector
Electric Distribution Dept
New Orleans Public Service Inc

PULLING electric conductors of No. 2/0 and up can become quite a problem. This problem was solved for our company by a line foreman who designed an attachment driven by a power take-off from the truck transmission.

A standard cable reel was mounted on a flat bottom truck. On the reel was placed a sprocket with ratio to the driving sprocket of approximately one to four.

Several hundred feet of rope line (bull line) was placed on the reel which is payed-out along the pole line. The conductor is attached to the end of the line which is wound on the reel pulling it in place.

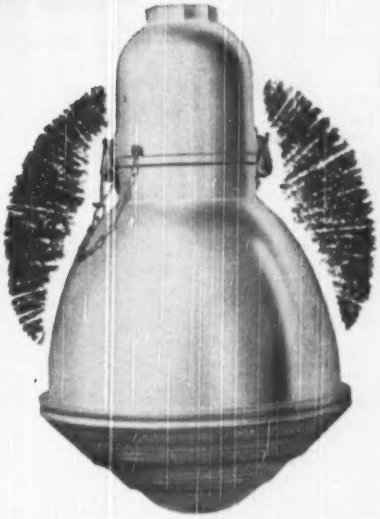
what's **New** in street lighting

4 WAY Optical Assembly for very long spacing in residential areas

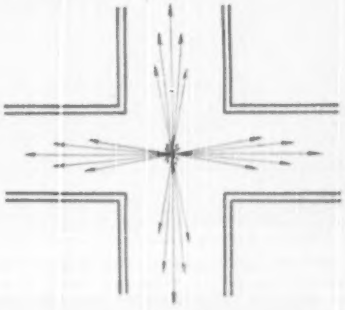
Here's a new high-efficiency luminaire, designed especially for right-angle intersections in residential areas. Companion to the already popular two-way Type VR, the new four-way Type VR directs light into four narrow, high-angle beams, 90 degrees apart.

This luminaire will find its greatest application on streets carrying very light traffic where the economy of long spacing, with 4000- and 6000-lumen lamps, is desirable. The Holophane Verti-lateral refractor provides a high angle of maximum candlepower—but with sharp cut-off above this angle. Because of the deeply shielded light source, the sharp cut-off, and the relatively low brightness of the apparent light source, glare is held to a remarkably low level. Minimum light is wasted on house fronts and off-street areas.

This new 4-way Type VR assembly can be used with G-E Form 79 or 101 aluminum hoods or with Form 45H and Form 72 wet-process porcelain insulators. Full information is available at all G-E Apparatus Sales Offices. *Apparatus Dept., General Electric Co., Schenectady 5, N. Y.*



This is the 4-WAY Type VR optical assembly on a Form 79 hood. Using either 4000- or 6000-lumen lamps, the Type VR is economical both in installation and in operating costs. Maximum candlepower is emitted at a comparatively high angle, yet with excellent side shielding to give long, narrow light distribution on all four legs of a 90 deg. intersection.



GENERAL ELECTRIC

Alternatives to Trimming and Removing Trees

A report from ten companies covering six remedial methods used when trees cannot be trimmed or removed. Based on a preliminary report prepared by the Transmission and Distribution Committee of The Pennsylvania Electric Association

Remedies Employed

REPORTING COMPANY	OVERHEAD CABLE	TREE WIRE	TREE GUARDS	REROUTE LINE	INSTALL HIGHER POLES MAXIMUM HEIGHT USED	FUSE TAP LINES
A	.....	On 2.4 kv △ and 4.16 kv Y	No	Not so far	Extreme cases only	When outages are frequent from tree trouble. In these cases trying to install reclosers and/or sectionalizers
B(1)	On some 4 kv circuits	No	Tree insulators where attachment is possible using lag screw	When r/w cannot be secured	In some instances 55-60 ft	In some cases
C	No	No	No	No	Yes, about 50 ft	Yes
D	When trimming can't be obtained. 2.4 kv rating used with good results	On 2.4, 4.16 kv Y, satisfactory	Wood molding and tree attachments	When trimming can't be obtained	When trimming or rerouting is impractical	Fused taps isolate faults satisfactorily
E	Used, but not as a solution for tree clearance problem	Used, but not extensively, on 4 kv lines and street lighting	Experimental basis on 4 kv and secondary lines. Not in service long enough to determine effectiveness	As a final expedient	Considering over-building trees on 4 kv feeders and mains 55 ft	Yes
F	None in use	Special cases; fair results up to 4.8 kv △	Very few used	In extreme cases	Prefer not over 50 ft but would go to 80 ft	Where line serves not over two customers
G	On 4 kv, where trimming can't be obtained and appearance is factor. On 26 kv where trimming can't be obtained and no alternative route is available. Also to permit joint use of poles. Experience good with 4 kv and 26 kv	On 4 kv and series street lighting circuits where there are tree conflicts and trimming is permitted	Wood and plastic guards for No. 4 and 6 tree wire	A last resort, done in one or two cases	As required but usually only on 26 kv 75-80 ft	Not usually
H(2)	No	Occasionally on 2.3/4 kv, good results	No	Occasionally 6.9 kv, 8 kv and 12 kv	Occasionally 60 ft	Occasionally on short lines with bad tree conditions. Normally branch fusing provided to isolate such faulty conditions regardless
I(3)	No	Where small limbs encounter distribution circuits	Where conductors rub on heavy limbs that can't be removed	When rebuilding lines, may relocate to eliminate tree condition	In some cases 55 ft	Tap lines through bad tree conditions to isolate from main line
J	No	Occasionally on 4 kv and street lighting circuits	Snap-on type on 4 kv and street lighting circuits with good results	When rebuilding lines, will locate to eliminate tree conditions	50 and 55 ft	Generally fuse tap lines to isolate from main line

NOTES:

1. For better public relations, this company believes that, where there are trees, poles carrying wires should be at least 45 ft high. The extra cost of higher poles should be offset by less tree trimming work.

2. This company has had good success using tree trimming contractors who obtain permits and do necessary trimming. Alternatives listed occur so infrequently that no standard has been developed.

3. Every effort is made by this company to secure permission from property owners to either remove trees or keep lines free from trees. Special precaution is taken in laying out new lines to eliminate tree clearance conditions.

Improved thyratron test set locates stubborn cable faults faster

Here's the biggest advance in cable testing in almost 20 years.

It is the kenotron—or voltage doubler—that is now being built into General Electric thyratron fault-reduction and localization cable test sets from 500 to 20,000 volts.

A thyratron set of 10-kv, for example, now automatically develops up to 27 kv d-c potential as needed. This high voltage starts a small current, rapidly reducing the resistance, to a point where the 5-amp d-c thyratron current will rapidly burn down the faulted point. Following burndown the set is used to apply an interrupted d-c tracing current permitting fault location by means of an exploring coil, test prods, and a galvanometer.

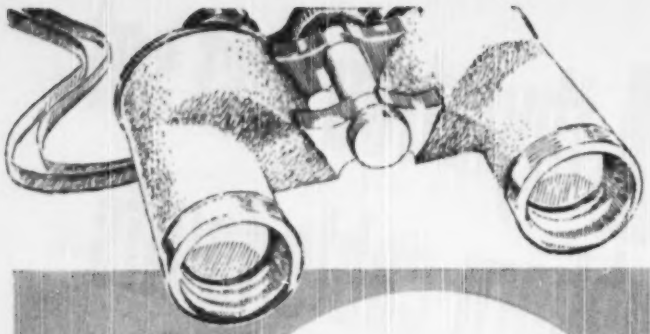
You save hours on stubborn faults. On stubborn faults, this can save you hours. It eliminates the trouble of faults re-sealing before you can switch over to the thyratron set.

Your local General Electric Sales office can give you full information. *Apparatus Dept., General Electric Company, Schenectady 5, N. Y.*

The thyratron d-c Fault-reduction and Localization set employs the direct method of fault location. A continuous, high, d-c voltage is applied to the faulty conductor. When the fault resistance has been reduced by a current of 2½ to 10 amperes, an interrupted d-c tracing current is applied.

The thyratron set is usually best used in conjunction with a kenotron testing set which warns of weaknesses before actual breakdown in service occurs. The thyratron set is the fastest and most positive method of locating faults—whether found in periodic testing, or after a service failure.

GENERAL ELECTRIC



See how WITH THESE

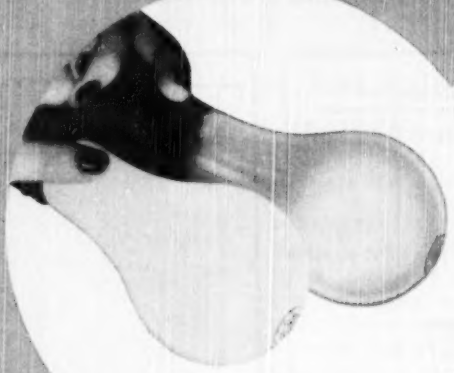
1. NEW GENERAL ELECTRIC 50-GA LAMP dresses up chandeliers and ceiling rosettes. Directs part of the light upward —part downward. Tinted enamel coating on under portion mellows the light to flatter surroundings.

3. ANOTHER NEW ALL-OVER-BRIGHT LAMP is the new G-E indirect-lite lamp. Gives balance of upward and downward light. Available in 150-watt size and 50-100-150-watt 3-lite. Like the 100-watt White lamp, it has the new kind of inside finish that gives near-perfect diffusion.

5. THE FOUR NEW G-E LAMPS shown here have all been introduced within the past two years. By constantly developing new and better lamps, General Electric helps make life brighter for everyone.

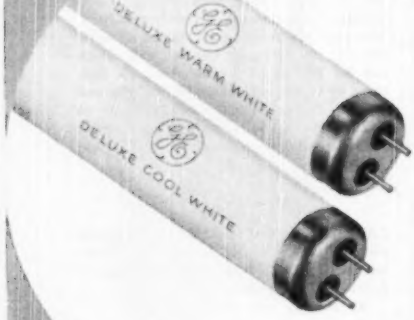
everyone Brightens Up

NEWEST GENERAL ELECTRIC LAMPS!



2. LIGHT IS SOFTER, MORE PLEASING

with General Electric's new White lamp bulb that's all-over bright. 100-watts. Will mean better lighting in your customers' homes. Photos show difference between White lamp (left) and standard lamp (right).



4. NEWEST IN FLUORESCENT,

G-E De Luxe white fluorescent lamps bring out full beauty of all colors as fluorescent has never before been able to do. De Luxe white fluorescent lamps flatter furnishings and complexions, are available in two types—Cool White and Warm White—to give choice of atmosphere.

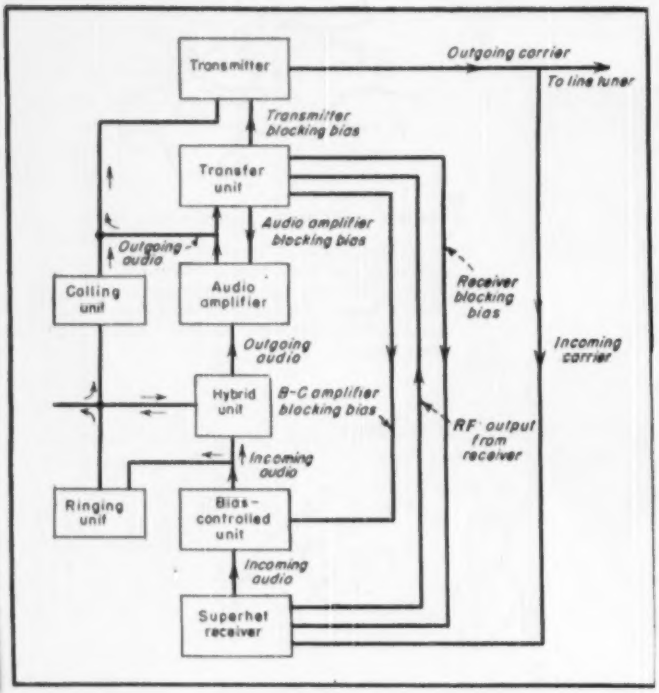
LAMPS

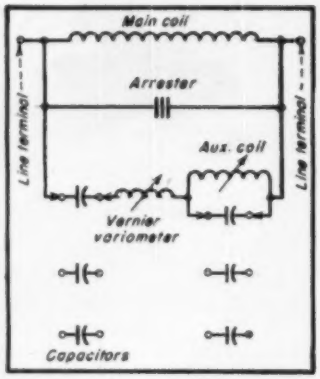
GENERAL ELECTRIC

Power Line Carrier System Assemblies—II

R. C. CHEEK, Central Station Engineer, Westinghouse Electric Corp, Pittsburgh, Pa.

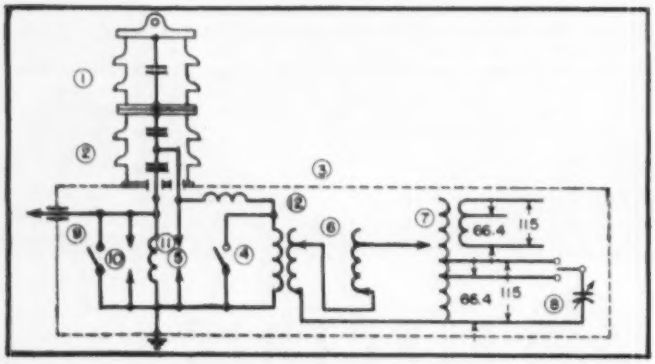
A main carrier communication system, a coupling capacitor, and a double-frequency trap are outlined by basic units and elements. Three other main carrier communication systems were outlined in Engineering Reference Sheet 50-29





LINE TRAP for double-frequency carrier has circuits to obtain double resonance characteristic

SINGLE-FREQUENCY automatic-simplex assembly with code-bell calling. System permits a single conversation among several stations on the channel. Assembly consists of units used in two-frequency duplex assembly plus (1) an electronic-transfer unit which switches the equipment automatically from stand-by to transmit or receive as required and (2) a receiving audio-amplifier unit to block receiver audio output without disabling the radio-frequency portion



CARRIER COUPLING capacitor includes potential device to supply voltage for operation of protective relays and indicating instruments. Elements are:

1. Coupling capacitor
2. Multi-unit coupling capacitor
3. Base housing
4. Transformer grounding switch
5. Transformer protective gap
6. Variable reactance transformer
7. Voltage adjusting transformer
8. Power factor correction transformer
9. Carrier apparatus grounding switch
10. Carrier apparatus protective gap
11. Carrier drain coil
12. Carrier choke coil

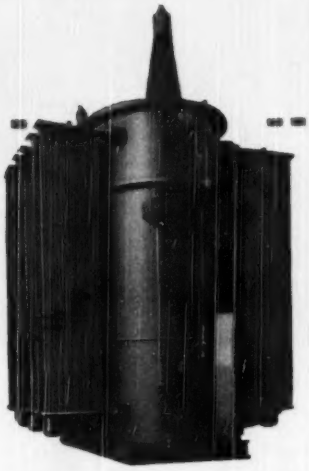
Adapted by permission of Westinghouse Electric Corp from forthcoming "Electrical Transmission and Distribution Reference Book," 1950 edition.

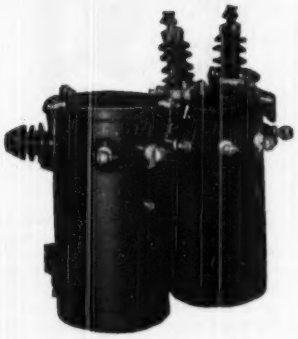
For Better Performance

specify

MOLONEY TRANSFORMERS

...less maintenance expense...longer life...
better performance proved by operating records!





POWER TRANSFORMERS

Research, with our 2,500,000 volt Surge Generator playing an important part, together with 50 years experience in the *exclusive* manufacture of transformers is responsible for the fine operating records users are experiencing with Moloney Power Transformers.

Modern design, workmen of long experience, highest grade material and adequate processing facilities are combined to produce these transformers.

DISTRIBUTION TRANSFORMERS

Moloney HiperCore Distribution Transformers are widely used on utility distribution systems and in industrial lighting and power applications. Here too, Moloney's engineering and research have combined to make a superior product to fit your needs. Moloney Distribution Transformers are available in capacities from 3 to 500 Kva, in voltages up to 66,000 volts.

MOLONEY PRODUCTS

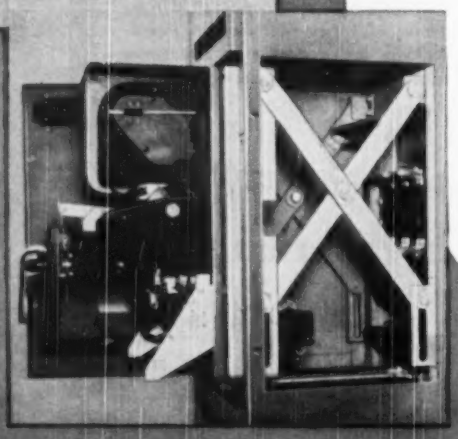
- Power Transformers
- Unit Substations
- Load Ratio Control Transformers
- Step Voltage Regulators
- Regulating Transformers
- HiperCore Distribution Transformers (Conventional and CSP Types)
- Load Center Transformers
- Askarel (Non-Inflammable Liquid) Cooled Transformers
- Air-Cooled (Class A and Class B Insulated) Transformers
- Constant Current Street Lighting Transformers (Conventional and Packaged Unit Types)
- Submersible Type Transformers
- Network Transformers
- Capacitors

Sales Offices in all Principal Cities

MOLONEY ELECTRIC CO.

FACTORIES AT ST. LOUIS, MISSOURI
AND TORONTO, ONTARIO, CANADA

Here's the *best*



I-T-E MULTUMITE SWITCHGEAR FEATURES EASIER ACCESS TO BREAKERS!

On both high- and low-voltage Multumite Switchboards, the easy-to-remove breakers are prized by maintenance men. I-T-E 5KV Breakers are truck-mounted for quick, easy withdrawal from compartments. Low-voltage I-T-E Breakers are pantograph-mounted, and all components are accessible when breaker is withdrawn. In the fully withdrawn position, breaker can easily be removed; the metal feet on its base make it a self-standing unit. Both HV and LV breakers may be tested while still in their compartments.

Send for these descriptive bulletins

BULLETIN 6003-D: A complete reference guide to I-T-E 600V Switchgear assemblies. Contains detailed information on I-T-E Multumite and helpful facts for specifying and ordering complete switchgear installations.

BULLETIN 7000-A: Describes I-T-E's newest 5KV Switchgear — illustrated and supplemented with practical, easy-to-read drawings and diagrams. If you have any questions on modern HV switchgear construction, it will pay you to have this bulletin.

Get both of these helpful bulletins now. Ask your local I-T-E Representative or write I-T-E General Offices.

way to order electrical protection

Let I-T-E supply the complete job!

You'll discover how easy—and economical—solving electrical distribution problems actually is when you put the I-T-E organization to work for you. I-T-E furnishes everything you need in engineering and equipment. For instance, here's what you get when I-T-E supplies your switchgear:

• PROPER APPLICATION FOR YOUR SPECIFIC NEEDS: Every I-T-E Sales Engineer is a *switchgear specialist*—fully qualified to assist you in planning all parts of your distribution system. Thus, your I-T-E Switchgear is designed for your specific problems—built to meet your needs!

• EFFECTIVE, PROPERLY COORDINATED UNITS: I-T-E supplies the finest components for every part of your distribution system. I-T-E's own equipment is designed better to last longer. Purchased auxiliaries must meet highest standards of excellence. And all components are coordinated by I-T-E's engineers into efficient, functional units of maximum dependability.

• QUICK, EASY INSTALLATION: Your I-T-E equipment is completely assembled and tested by I-T-E *before* shipment. It is delivered to you, ready for connections. Installation is simplified; chances of failure because of improper assembly are minimized.

• A SYSTEM THAT'S EASY TO OPERATE, EASY TO MAINTAIN: All components of I-T-E units are functionally arranged for easy, simple operation. And your maintenance men will be enthusiastic when they see how much more *accessible* I-T-E units are. Inspections and maintenance are easier, take less time!

• IT'S EASY TO ORDER, WITH QUALITY GUARANTEED! A *single* order is all it takes for a *complete* I-T-E job—from the simplest panelboard, to everything necessary for a complete distribution system. I-T-E designs, builds, and ships your job as a "package"—and accepts complete responsibility for the operation and performance of every component!

Extra service and extra quality—which you get without extra cost—make I-T-E your best switchgear buy!

I-T-E

For *more dependable* Switchgear

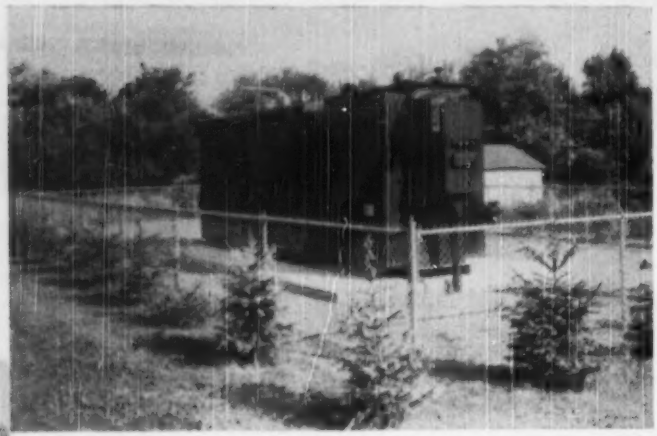
specify I-T-E!

I-T-E Circuit Breaker Company
19th & Hamilton Streets, Philadelphia 30, Pa.

Power Switching Equipment Division: Railway & Industrial Engineering Co., Greensburg, Pa.
Canadian Mfg. & Sales: Eastern Power Devices, Ltd., Toronto
Export Sales: Philips Export Corp., New York

SWITCHGEAR • UNIT SUBSTATIONS • ISOLATED PHASE BUS STRUCTURES
CIRCUIT BREAKERS • MECHANICAL RECTIFIERS • RESISTORS
SPECIAL PRODUCTS

Landscaping—Before and After



General Electric Photos

UNIT SUBSTATION, when first placed in service on the Central Hudson Gas and Electric Corp's distribution system, had a bare appearance. Eight years later, time has transformed the lanscaping into an attractive hedgerow which brackets a gravel roadway at right to lend a pleasing appearance. Substation is rated 1,500/2,000 kva, 13,200 to 4,330 v

• • •

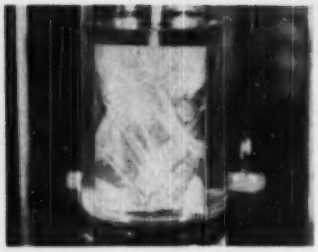
Reworked Turbines Increase Output

BY ENGINEERING OUT a bottleneck at the turbine, Consolidated Edison Co of New York is developing an extra 20,000 kva on two turbogenerators at its East River generating station.

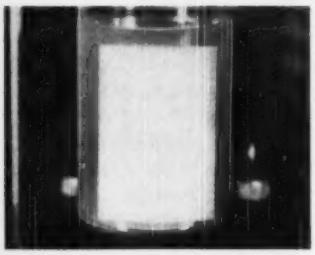
Because sufficient steam was available to drive the machines over their rating, it was decided to rework the turbines to make use of this steam. New buckets having heavier sections and increased width to sustain heavier steam loading were installed on nine of each turbine's twenty stages; a new first stage nozzle block and nineteen new diaphragms were also installed.

First stage nozzles and thirteen of the new diaphragms are welded construction. Web and outer ring of these diaphragms are made of molybdenum bearing steel for increased strength. Six other new diaphragms are made of cast steel with heavier portions to reduce stresses and permit a reduction in diaphragm thickness so as to accommodate wider buckets.

A new single runner thrust bearing, with tapered land plates capable of sustaining higher loads, was installed to replace a multi-runner type thrust bearing.

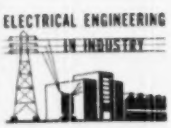


GREASY steel plate is placed in caustic solution; a magneto-striction transducer generates 33-kc sound waves in the liquid



CLEAN and thoroughly greaseless after 10 sec, steel plate has been scrubbed by solution molecules agitated by ultrasonic waves

Ultrasonics Speed Up Industrial Processes



TWO FACTS are basically responsible for the application of ultrasonics to the speed-up of present industrial processes and the creation of new ones:

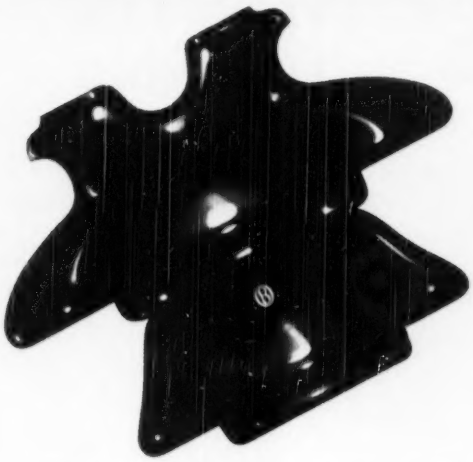
1. Sound vibrations can be generated in liquids with such magnitude that the liquid molecules oscillate with almost unbelievable forces, corresponding to several thousands of times the force of gravity.

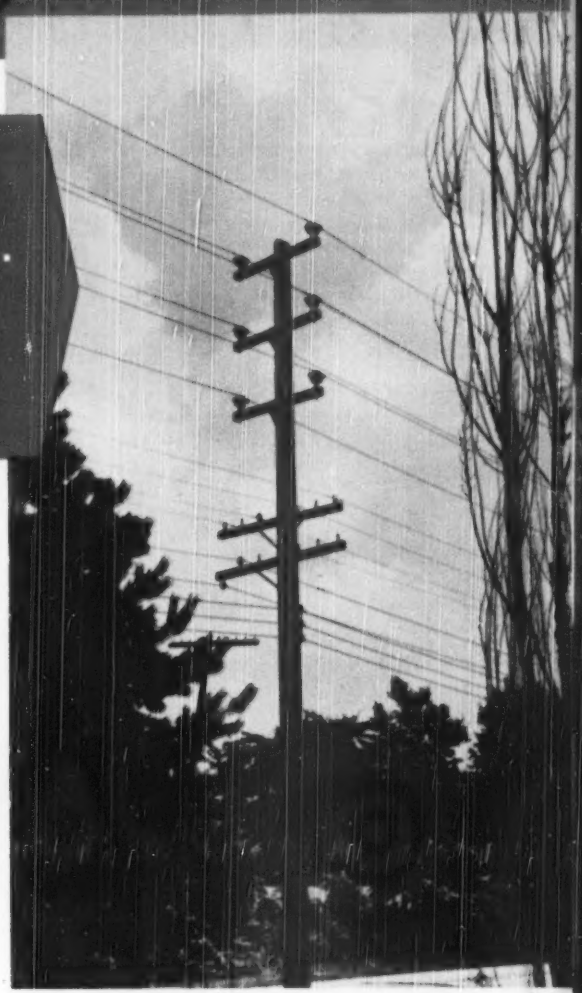
2. These terrific molecular forces can be produced in liquids for vibratory motions of only a few millionths of an inch and can be readily generated by several different practical methods.

The answer to "how-it-is-done" is found in the Massa Laboratories, Inc, Cleveland, where Frank Massa, head of the organization, has been applying principles of sound engineering as new basic industrial tools. For example, ultrasonic sound waves have thoroughly cleaned sheet steel of a heavy coating of heavy and light

HI-TENSION NEWS *Junior*

One of the cheapest parts of a power line... *MOST of the time!*





Very few investments can increase in value as fast as an insulator. You may buy an ordinary pintype for a dollar or two that, in a millionth part of a second, can cost you several hundred!

Few parts of a line, even the pole holes, are as cheap as the insulators. Yet lightning can make an insulator outrageously expensive when you add up patrolling for trouble, line truck cost, wages of ground crews, linemen, and drivers, and the loss of line revenue. Put your own value on the public good will involved -- all for an insulator that *need not* have failed if lightning had been included in its basic design assumptions.

Pintype insulators operating on unshielded lines are sure to sustain flashover as a result of lightning, but they can be made to resist damage until this electrical stress is relieved by breakdown of the surrounding air path. This is not a common characteristic of *all* pintypes. Years of testing, research, redesign, and retesting in the insulator industry's greatest laboratory are behind modern O-B units that can be trusted to survive the shock of lightning voltages.

If you want pintype insulators to *stay cheap* and your lines to *stay serviceable*, there's an easy answer -- specify O-B. It will help you sleep on a stormy night!

Ohio Brass

MANSFIELD, OHIO, U. S. A.

THOREX

VALVE TYPE LIGHTNING ARRESTER

offers rigidly-controlled protective characteristics.

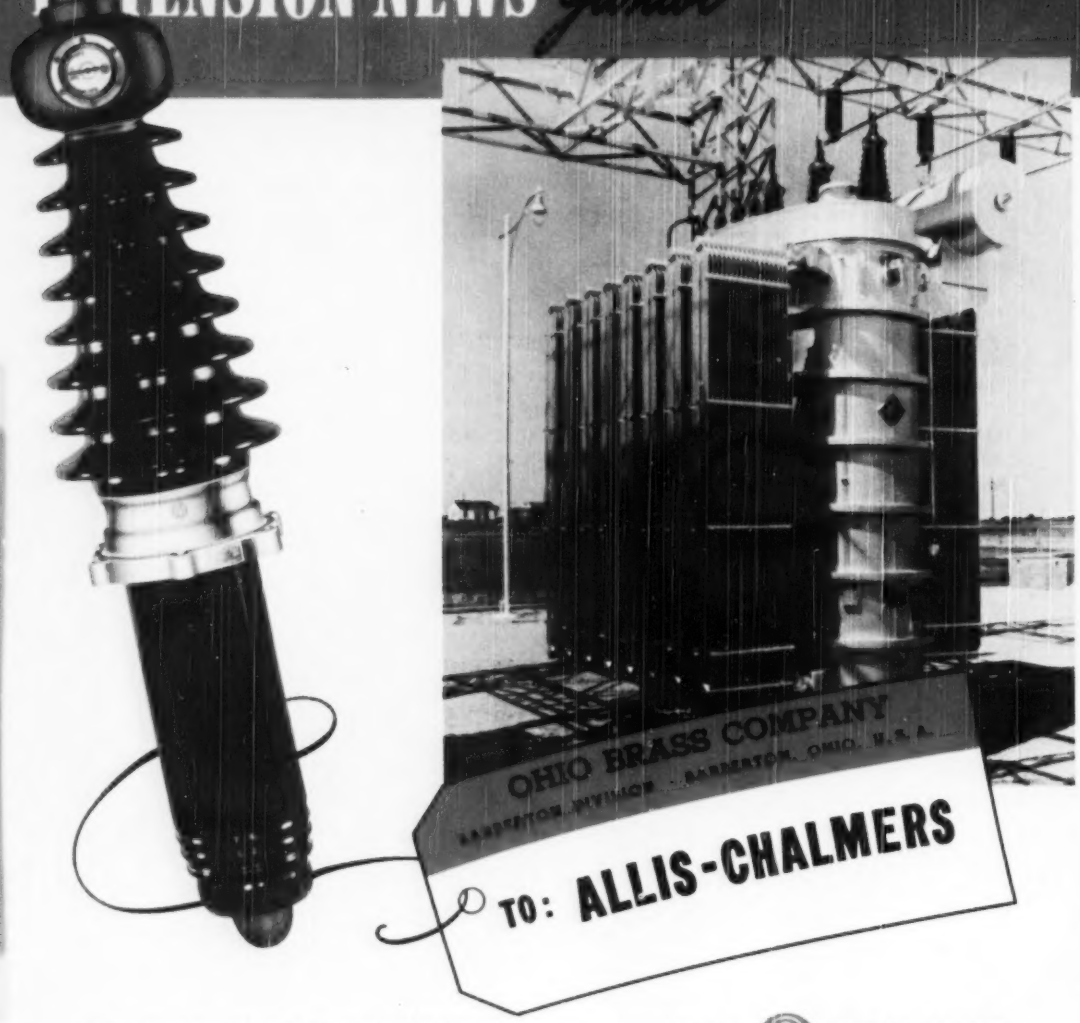
With a radically simplified and improved spark gap structure -- resistance graded and pre-ionized -- sparkover behavior of the new O-B Thorex arrester is fast and consistent in both sparking and power-follow quenching cycles. O-B cataloged values offer a sparkover performance tolerance of less than +10%. Since this represents a maximum encountered in total arrester production, it is apparent that individual specimens will usually fall well within such values . . . Specially compounded and selected crystals of silicon carbide, formed into valve blocks with a high-temperature-fired inorganic binder, impart to the regular production of the Thorex arrester a low IR discharge voltage combined with a tolerance of less than +5%, again representing a conservative over-all production limit, below which maximum most Thorex arresters will be found to operate. These arresters have a discharge capacity of 100,000 amperes and the ability to meet easily the 10,000-ampere duty cycle test; both as specified by AIEE Standard 28-A . . . The arrester that has first combined such desirable properties -- the O-B Thorex -- does so with radically reduced size and weight . . . Discuss the new Thorex valve type lightning arrester with your O-B representative. It offers you a new combination of simplified design and advanced protective characteristics.

Ohio Brass

MANSFIELD • OHIO

GP-30 GP-37 GP-40 GP-50 GP-60 GP-73

HI-TENSION NEWS *Junior*



When load growth called for the addition of a new substation in a Southern metropolitan area, this Allis-Chalmers power transformer was selected for the job. Rated 15,000 kva, and capable of 20,000 kva with cooling fans, Allis-Chalmers points out such features as: "simple, protective 'Oil-Sealed' inert gas system pioneered 26 years ago and now standard on over 5,000,000 kva of U. S. Power . . . rigidly braced and specially treated circular coils . . . controlled gasket compression . . . Bonderized radiators . . . "

ALSO (B) BUSHINGS

ONE OF THE FINEST COMPONENTS OF ANY TRANSFORMER

Ohio Brass

MANSFIELD, OHIO, U. S. A.

(B) 3043-H

grease in 10 sec—a job that would require at least 20 min by boiling the steel in the same ordinary caustic cleaning solution. A magneto-striction transducer (generator) sent 33-kc sound waves into the cleaning solution, causing molecules to bounce against the metal and scrub it clean. Descaling can be accomplished in about 10 sec also.

In other instances, pilot operations and laboratory experiments have proven that such incompatible liquids as oil and water or mercury and water easily form intimate mixtures when subjected to ultrasonic energy. Synthetic colloids are produced with finely divided particles by subjecting the solution to more than 20,000 sound vibrations per sec. Complete de-gassing of liquids has been accomplished using ultrasonics and very dense castings have been produced by activating molten metal to cause de-gassing during cooling period.

In other experiments, seeds treated in ultrasonically activated liquids produced unusual plants, with yield and size of fruit usually greatly increased. Butter has been produced from milk in a few seconds by ultrasonic churning. The "wetting" action of a liquid is substantially increased when activated by ultrasonic energy, a characteristic of great importance and promise to the textile industry.

TOOL BAG stamped with the lineman's name eliminates delays when trouble crew has to be picked up on way to trouble area

Lineman's Handbag A Time Saver

On the United Illuminating Co system (New Haven and Bridgeport, Conn.) individual linemen are supplied with a strong bag for tools. Each

Now!!! **Aluminum Alloys and Stainless Steel**

are combined for still more years of trouble free servicing with

THOMPSON DISCONNECTING AND LOWERING HANGERS

New Thompson Aluminum Unit Package. Never before so light, so strong, so resistant to corrosive atmosphere and weathering.

New Unit Packages provide for open vertical chain as illustrated, or enclosure in ¾" conduit for complete protection from weather and tampering.

New VR Adapter for bail or yoke suspended floodlights. Assures perfectly balanced support with unbelievable simplicity.

NEW ALUMINUM UNIT PACKAGES

are available for easy, low cost, safe, servicing of threaded pendant hood luminaires, bail or yoke suspended floodlights, aeronautical obstruction lights and 300 MM flasher code beacons.

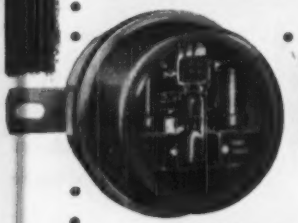
NEW 1950 CATALOG AVAILABLE. Also new Bulletin, Aeronautical Obstruction Lighting with Thompson Hangers. Request on your Company Letterhead.

THOMPSON DISCONNECTING & LOWERING HANGERS

THE THOMPSON ELECTRIC CO.
1101 POWER AVENUE • CLEVELAND 14, OHIO

Fisher-Pierce
Photoelectric Controls

CUT
STREET LIGHTING
COSTS



Series 63300 30 Amp. contacts

Fisher-Pierce Photoelectric lighting Controls have a continuous record of low-cost service by more than 600 electric utilities in more than 17,000 installations.

Fisher-Pierce should be on *your* "Standards" list. Controls for examination and test can be shipped immediately from stock.

Approved by street lighting engineers and maintenance men throughout the world, Fisher-Pierce units offer a simplified Photoelectric relay for control of multiple or series street lighting systems. Fisher-Pierce controls give you long tube life (20,000 hours or more), easy servicing, (plug-in chassis construction), *no resetting after power interruptions*. In other words, exceptionally *low maintenance costs*.

Series 61300 5 Amp. Contacts

Models available for direct-connected lamp loads up to 3000 watts, for pilot-wire relay systems, and oil-switch controls for series systems.

Ask for Bulletin 63300

The FISHER-PIERCE COMPANY, INC.
82 CEYLON ST., BOSTON 21, MASSACHUSETTS

bag has a lock and key and is stamped with the user's name.

After each working day the lineman puts his tools in his bag and locks it. Bags are placed behind the lineman's designated truck or in another convenient place. This plan does away with trucks going out on trouble jobs with linemen's tools belonging to men who were not called in or could not be quickly located at the time of the call.

Facilitates Emergency Calls

In some cases it may be desirable for men to keep their tools on a truck overnight. Such a scheme is advantageous when the truck driver has to pick up linemen on the way to the trouble area. The dispatcher calls the men needed while the driver puts their bags aboard the truck. Emergency work thus functions more uniformly and smoothly.

BELT CONVEYOR was adopted for excavating transformer vaults with only minor changes including 125 ft of 3/C cable

Belt Conveyor Reduces Cost of Digging Vaults

A GENERAL PURPOSE, sliding belt conveyor for loading excavated material directly into a truck is substantially reducing the cost of digging transformer vaults on the underground system of Dallas Power and Light Co.

The conveyor is of the solid pan

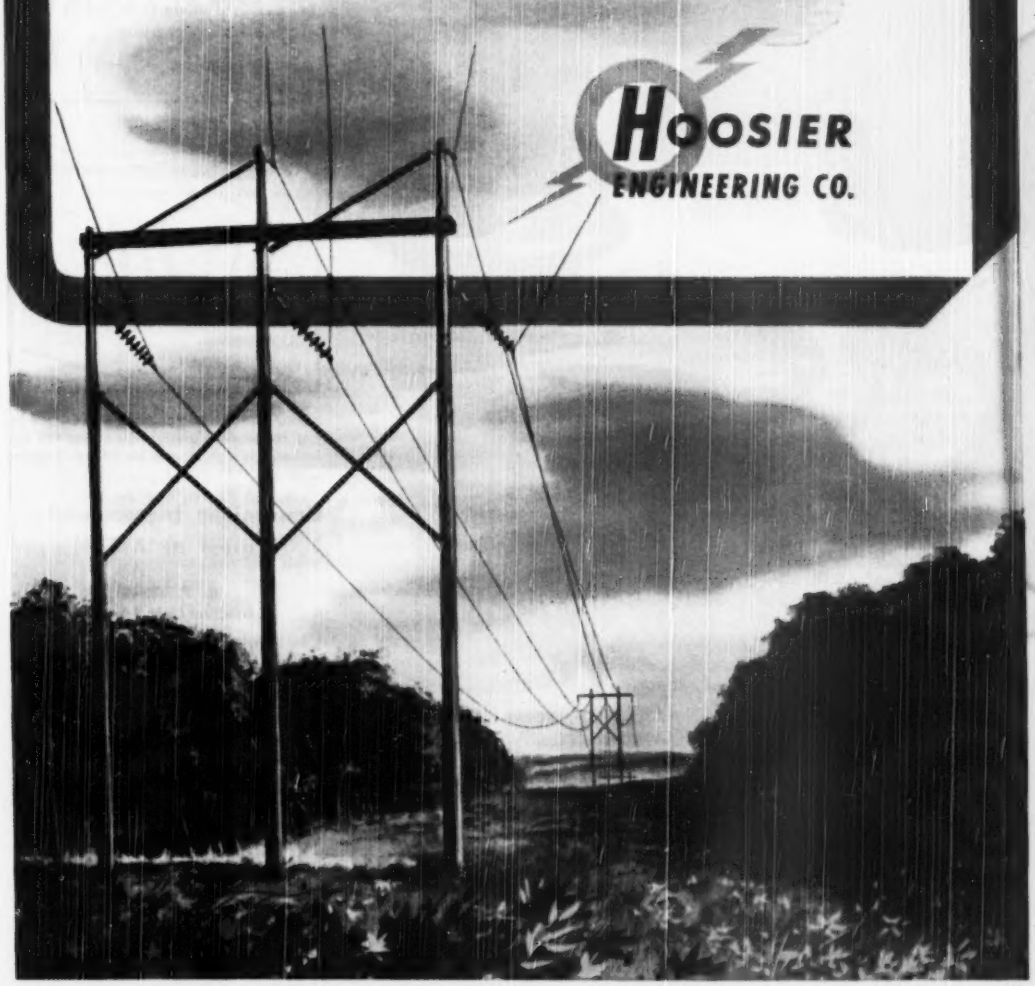
The Tougher the Job . . .

the more we can help. For Hoosier engineers are more experienced in handling the erection and maintenance jobs that have proved unusually difficult for utilities throughout the country. Hoosier engineers, trained men and special equipment are available at any time to supplement your own organization or work independently.

ERECTION AND MAINTENANCE OF TRANSMISSION LINES

NEW YORK • 1384 HOLLY AVE., COLUMBUS, OHIO • CHICAGO

HOOSIER ENGINEERING CO.



FOR ALL YOUR ELECTRICAL PORCELAIN NEEDS

Specify ILLINOIS!

GUY STRAIN INSULATORS

Manufactured under rigid control standards, from the careful selection of materials through all steps leading to the top quality finished product. Internal stress eliminated through uniform firing at constant temperatures.

Available from large stocks of standard sizes.

SPECIFY ILLINOIS PORCELAIN

SPOOL INSULATORS

You won't find a better wet process porcelain spool! Here's the right combination of dependable mechanical and electrical strength in a wide range of styles and sizes produced to the usual high quality standards maintained by Illinois. Also manufactured by the dry process method to your specifications.

HIGH DIELECTRIC STRENGTH
HIGH MECHANICAL STRENGTH
EXACT DIMENSIONS
COMPLETE UNIFORMITY

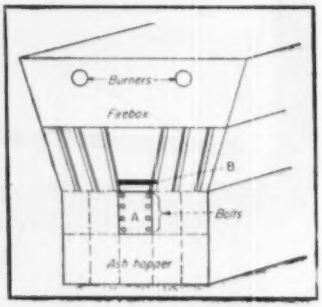
ILLINOIS ELECTRIC PORCELAIN CO.

MACOMB, ILLINOIS

type, usually used for handling coal, fertilizer or other lump material. It is approximately 24 ft long. The belt is 14 in. wide with flights spaced about 16 in. apart. It is driven by a 5-hp, 3-ph, 220-v motor and has been found to work well with rock, sand or mud. Minor modifications were necessary to adapt the unit to the excavating job.

Power from Service Riser or Bus

The conveyor is equipped with 125 ft of 3-conductor, No. 12 cable. When the conveyor is used in the underground area, the cable is run to a nearby service riser, vault or distribution box. Outside the network area, the power supply is obtained from an overhead bus. If the cable is not long enough, then a temporary extension is made to a source either overhead or underground.



REMOVABLE PLATE (A) and ½-in. rod or pipe (B) provides a safe, time-saving way for workmen to get in and out of ash hoppers

Convenient Ingress and Egress at Ash Hopper

R. T. JELLY
Connecticut Light & Power Co
Montville

WHEN REPAIRING or bricking ash hoppers at Montville steam station, workmen have been provided with a safe and time-saving method of climbing in and out of hoppers.

Removable plate (A on illustration) is unbolted to form an opening through which men and materials pass. A ¾-in. pipe or rod, welded or bolted to angle irons (B on illustration), provides a convenient hand hold. This scheme replaces the old, unsafe method of shinning up and down the hopper walls.

When you think of Electric Heat,

think of Hoskins Chromel*

It's a good idea, from time to time, just to sit back and think about electrical heating appliances. Ranges, roasters, irons, toasters . . . water heaters, clothes dryers, space heaters, and all the other domestic heating devices connected to your lines. Think about how many of each there are in use today . . . and the KWH consumed by them over an average year's operation. Then figure out roughly what this tremendous heating load means in relation to your total power sales.

As a starter . . . just from readily available consumer statistics, you will find upwards of *130 million* domestic heating appliances being used in America's homes today. Collectively, their operation will require around *30 billion* KWH during the present calendar year. And this collective figure has been estimated to represent better than 45% of the total electrical energy used for domestic purposes. (All statistical sources available upon request.)

Why think about Hoskins CHROMEL when you're thinking of electric heat? Simple! Because Hoskins CHROMEL is the *original* nickel-chromium resistance alloy that *first* made electrical heating practical. It is used wherever you carry a heating load . . . whether domestic, commercial, or industrial. In fact, its consistently fine dependable durability has been an all-important contributing factor in helping you develop and maintain this profitable phase of your business.

Our Catalog M-1 contains helpful information for your Load Building Department . . . want a copy?

HOSKINS MANUFACTURING COMPANY

4445 LAWTON AVE. • DETROIT 8, MICHIGAN

NEW YORK • CLEVELAND • CHICAGO

West Coast Representatives in Seattle, San Francisco, Los Angeles
In Canada: Walker Metal Products, Ltd., Walkerville, Ontario

**the original nickel-chromium resistance alloy that first made electrical heating practical*

LOAD BUILDING

RESIDENTIAL • RURAL
COMMERCIAL • INDUSTRIAL

YONKERS RACETRACK, a half-mile harness racing oval, is lighted uniformly by 452 floodlights. The units have built-in rifle sights and are individually directed at a predetermined spot on the track, thereby eliminating possible disturbing shadow or glare

Focused Lighting Eliminates Glare

WHEN the floodlighting system at Yonkers Raceway, Yonkers, N. Y., was put in operation late in April, the installation was reported to be one of the best lighted tracks in this country. The system includes 452 flood-lighting units scientifically placed and focused around the entire half-mile track for trotting meetings.

At this former Empire City track the lights are mounted 80 ft above the ground on 10 steel poles around the track and on three towers on the grandstand. A bank of 32 lights is supported on each pole, 52 lights on one grandstand tower, and a bank of 40 lights on each of the other two grandstand towers. Each of the floodlight locations covers about 200 ft of track.

Area in front of the grandstand is the most brightly lighted with 196 units focused upon it, and of these, 12 are aimed at the finish line. The system was designed to aid in the taking of official photographs at the finish of each race, and to make possible clearer newsreel and television pickups.

Individual floodlights use 1,500-w lamps and are operated at 10% overvoltage. Reflectors for the lights are spun aluminum. The units have glass covers which are heat-resisting and dust-tight.

The track's parking area and entrances are illuminated by six 60-ft towers supporting a total of 58 1,000-w floodlights.

The track has an installed capacity of 1,500 kw. Power is supplied by Yonkers Electric Light & Power Co at 13 kv to a substation having a Westinghouse power center of two 750 kva transformers, and distributed at 4 kv to transformers on poles for 125-v utilization. In addition a 500-kva, 4-kv/125-v transformer serves the lighting in the grandstand and club house.

• • •

National Electrical Products Corp photo

SURFACE RACEWAY wiring system provides power for 400 portable electric sewing machines, also for illumination—at minimum cost with maximum flexibility and with moderate maintenance and repair. System permits changes in sewing machine positioning on sales floor

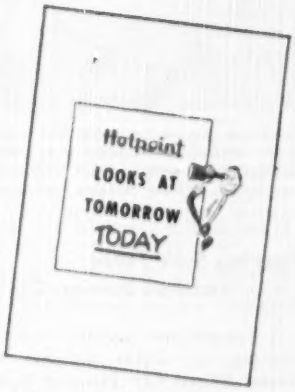
Surface Raceway System Provides Flexibility

THE ENTIRE production area of 21,875 sq ft of the New Levi Strauss & Co, San Jose, Cal., factory has been equipped with a surface raceway electrical distribution system eliminating conduit and boxes, keeping drop cords off the floor and away from damage, and providing a neat and streamlined appearance. This system permits the more than 400 portable electric sewing machines to be moved to various positions on the

Hotpoint has

up-to-the minute studies ready for fall utility sales planning...

...all keyed to today's load balancing objectives!



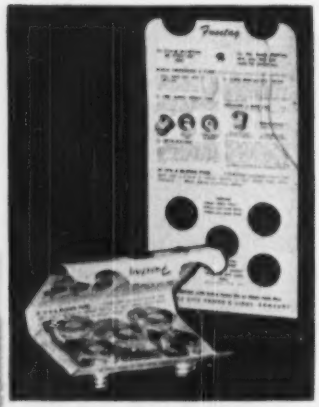
Watch for them!

Hotpoint Inc.
(A GENERAL ELECTRIC AFFILIATE)

Utility Division

5600 West Taylor Street, Chicago 44, Ill.

floor as dictated by varied production line demands. It also enables machines to be quickly disconnected, sent to the shop for repairs, and a spare machine moved into the line.



CARD is scored to fold into a "box" holding five plug fuses. One side carries directions for finding and replacing blown fuses; the other side tells what to do in case the electricity supply goes off

FUSETAG becomes a useful fuse holder when unfolded. String which holds "box" together can be used to attach card on or near fusebox to make changing fuses easier

Fusetag Sells Fuses; Reduces Service Calls

A COMBINATION PACKAGE, instruction tag, and display card has increased Kansas City Power & Light Co's sale of plug fuses 400%. It has also reduced service calls. The package, known as Fusetag, was invented and patented by two advertising employees when management was seeking a way to reduce service calls to replace blown fuses.

Each card holds five fuses in the bottom half. The upper half on one side carries instructions on what to do when electricity goes off; on the other side are instructions on how to find and replace a blown fuse.

The card can be folded into a "box" and is held together with a string. The customer is asked to untie the "box" and to use the string to tie it on or near the fuse box.

Fusetags are sold by company stores and servicemen. To promote their use the company raised its service charge for changing fuses last October when the tags were introduced.

The company buys the fuses wholesale, inserts them in the cards and ties the "boxes." Several fuse manufacturers are field testing Fusetag and may place them on the market.

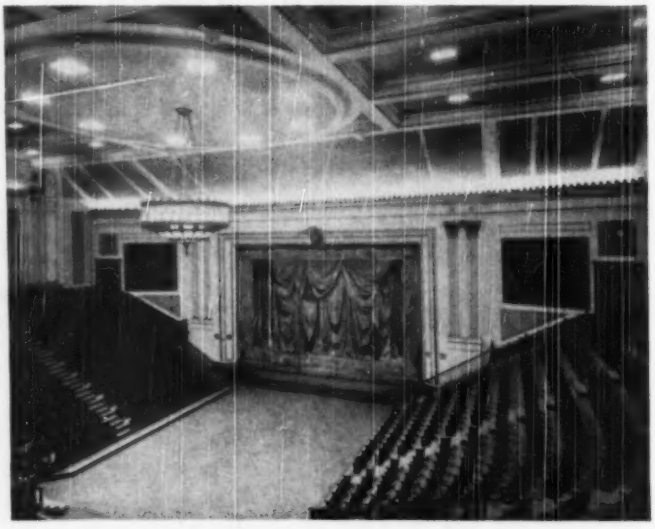
The system comprises 2,800 ft of raceway suspended from the roof trusses. It meets all code requirements and allows the power and lighting circuits to be placed in the same duct. Fluorescent lighting fixtures (245) are connected to and mounted from this raceway which permits changing their positions or plugging in additional fixtures easier.

• • •

Load Building Notes

● Uniform growth of about 10 kwhr per month in residential usage is shown in 12-month figures of averages per customer of the Georgia Power Co. At the end of April the figure was 2,451.6 kwhr. A month earlier it was 2,440.8; six months earlier, 2,396.6; a year ago, 2,332.8. The average annual bills for the same times were $52.56, $52.40, $51.31, and $48.74, respectively.

● Latest use for electric heat to come to notice is in the raising of crickets for the fish-bait market. In a cricket ranch down in Georgia, the high jumpers are raised in long metal bins, warmed with thermostatically controlled electric heaters.



Modern Lighting Adds to Beauty of Room

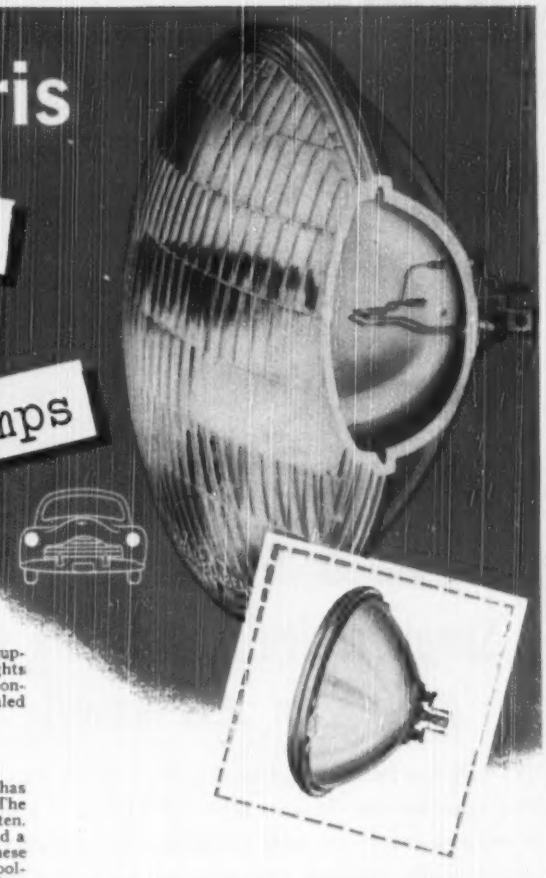
Inadequate and difficult to maintain, the lighting shown in this ceremonial room in the Scottish Rite Temple, Nashville, Tenn., soon deteriorated to deplorable condition. Attempts at improvement by putting larger lamps in the central fixture only made matters worse, by intolerably increased glare. Solution was found in Holophane Controlens units installed flush in the ceiling and accessible for servicing from above. There are 8 4-lamp, 26 2-lamp, and 12 single lamp units, all with 300-w lamps and totalling 28.8 kw. Initial illumination was 25 ft-c. All lamps are dimmer-controlled. Requiring no obtrusive fixtures, the new lighting emphasizes the beauty of the room by illuminating the details of its Grecian design

Driver-Harris

perfects

new alloy for

WESTINGHOUSE lamps



HERE WAS THE PROBLEM:

How to obtain a strong, rigid assembly for conductors supporting the filaments of sealed beam automobile headlights and, at the same time, make a perfect seal between the conductors and the glass housing of the lamp, so that gas sealed within the lamp might not escape.

AND HERE'S THE SOLUTION:

The back wall of the lamp, cast from Pyrex-like glass, has three holes through which the conductors can be passed. The area around these holes is heated until the glass is near-molten. Over each hole, on the rear side of the lamp, is then placed a "thimble"—made of *specially produced* D-H alloy. These thimbles are pressed into the molten glass, which, upon cooling, holds them firmly in position. The conductors are then passed through the holes in the glass wall, and their free ends soldered to the base of each thimble respectively. Lugs soldered to the thimbles, outside, provide terminals for mounting the lamp in a socket. In this manner, a strong, stable, gas-tight assembly is obtained.

Westinghouse discussed its needs with Driver-Harris. Could the necessary type of thimble stock be obtained, and supplied in strip form, .009" thick, with negligible tolerances?

The answer is found on all Westinghouse sealed beam headlights today. Driver-Harris not only produces an alloy with precisely the properties needed, but advanced D-H rolling techniques meet the exacting dimensional requirements specified.

SPECIAL ALLOYS FOR SPECIAL PURPOSES is an important phase of our business. If you have been unable to find the alloy you need, tell us about it. Our 50 years of development and manufacturing experience are at your service.

The part played by the metal thimbles in solving the problem is vitally important:

1. It is imperative that the thimbles be composed of a metal alloy *with a coefficient of expansion closely approximating that of glass at all temperatures up to the melting point of glass* Any appreciable difference in the rates of expansion would result in the glass being fractured.

2. The thimble stock must be initially and entirely gas-free—to avoid the possibility of bubbles or strains being formed in the glass at the seal.

3. The stock must be held to extremely close tolerances when manufactured—to meet the requirements of meticulous, high-speed presses and dies specially developed to produce the thimbles.

Makers of world-famous Nichrome and over 80 alloys for the electrical, electronic and heat-treating fields*

Driver-Harris Company

HARRISON, NEW JERSEY

BRANCHES: Chicago, Detroit, Cleveland, Los Angeles, San Francisco

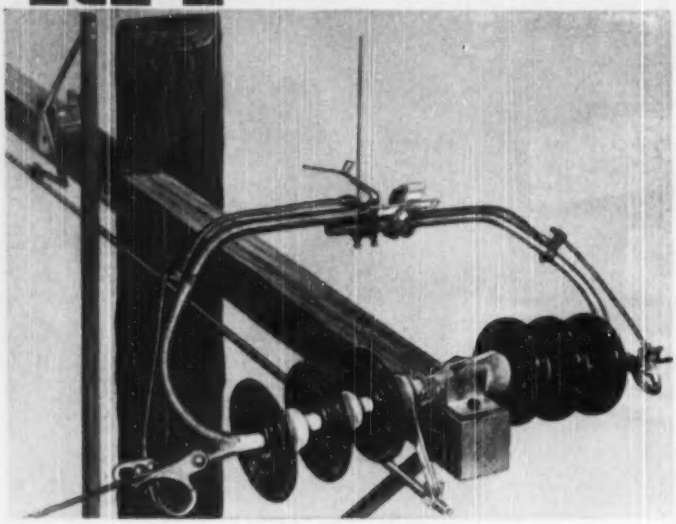
Manufactured and sold in Canada by

The B. GREENING WIRE COMPANY, LTD., Hamilton, Ontario, Canada

FIFTIETH ANNIVERSARY

*T. M. Reg. U. S. Pat. Off.

KPF POLE TOP SWITCHES



Simple design means more switch ...for less money!

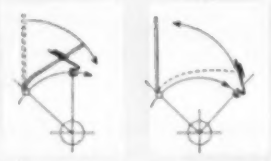
KPF Pole Top Switches cost less because they are simplest in design. They lower installation costs because they bolt on a single crossarm in minutes, require no extra insulators. KPF switches save, too, on upkeep; simple push-pull interphase rods never bind because of crossarm warpage; monel and bronze bearings never need lubrication.

KPF switches may be used in horizontal, vertical or triangular mounting. Free floating, self aligning blades and jaws maintain proper contact under all conditions of switch sag adjustment.

NEW QUICK-BREAK ATTACHMENT FOR KPF SWITCHES

The split-second breaking speed of these new KPF attachments means you can switch many circuits without using expensive circuit breakers. Attachment is available for all KPF switches rated 15 to 69 kv.

WRITE FOR DETAILS



Spring rod winds to full tension as switch opens.

Rod springs clear, breaking contact at high speed.

KPF ELECTRIC COMPANY
855 Howard Street • San Francisco 3, Calif.

INDUSTRIAL BRIEFS

Induction Heating reduced hardening costs of washing machine shafts to one third of previous costs and increased production rate 250% at the Maytag Corp plant, Newton, Iowa. Distortion from heating was reduced from .012 in. to .001 in. or less—shaft straightening and descaling was eliminated and rejects are nonexistent. The installation paid for itself in less than six months from savings realized. Two 20-kw, 450-kc generators are used.

Electrified Ozonation process frees west Philadelphia, Pa., water of objectionable taste or odor. This ozonation plant in the new Belmont Filtration Plant is completely electrified, and is said to be world's largest. Fifty ozone generators are supplied power by 50 25-kva 460/15,000-v transformers. Since ozone generators are in effect, capacitors, and produce leading power factor, 50 10-kva reactors, one for each unit, are used to bring the power factor to unity.

All-Electric Plastic injection molding machine presses out 200-oz of thermoplastic products at one time at the A. L. Hyde Plastics Co, Grenloch, N. J. Claimed to be the world's largest machine of its kind, it easily dwarfs the 60-oz machines which were previously considered large. Television and radio cabinets, refrigerator door linings, kitchen cabinet doors, etc, are examples of the large size products that may be made. The press has a 50 and a 10-hp motor. Resistance units taking 29 kw keep the plastic at proper temperatures —Wm. S. DeHaven, Power Sales Engineer, Atlantic City Electric Co.

Materials Handling mechanical changes combined with an ingenious system of electrical interlocking relays increased pulverizing line production from 188 to 1,000 lb per man-hour at the Irvington Varnish and Insulator Co, Irvington, N. J. System fires were eliminated and dust in the atmosphere materially reduced—resulting in less hazards and improved working conditions for operators.—E. A. Gloss, Chief Engineer, Irvington Varnish and Insulator Co.

"Light Magic"

FOR WORKING WONDERS in PLANNED LIGHTING!

"Pittsburgh" Permaflector

TWO NEW 48" and 96" SLIMLINE LUMINAIRES

THE "WASHINGTON" SLIMLINE LUMINAIRE features an egg-crate louver bottom and Skytex satinol glass side-panels. It is made in 2, 3 and 4 lamp models. Standard operation is 425-MA with T-12 Lamps. Bridge-truss construction assures a unit which "hugs" the ceiling when it is surface mounted.

THE "HARRISON" SLIMLINE LUMINAIRE, in 2, 3 or 4 lamp models. Gracefully curved side-panels, flat bottom-panels of Alba-Lite glass distinguish this modern slimline luminaire. Companion incandescent units are designed especially for use with the "Harrison" and other Presidential Fluorescent Luminaires.

The flexibility of Pittsburgh Permaflector Lighting Equipment is a modern miracle of design and construction.

For example—Pittsburgh Permaflector Slimline Luminaires are available in 48" and 96" lengths. They may be surface or pendant mounted, individually or end-to-end. When used with companion incandescent down-lights, they can be installed to form squares, rectangles, "T's", cross-overs, checkerboards and other patterns.

Such flexibility allows you full creative expression and makes possible "custom designed" lighting results with economical *standard* equipment.

Write today for more information on these versatile units.

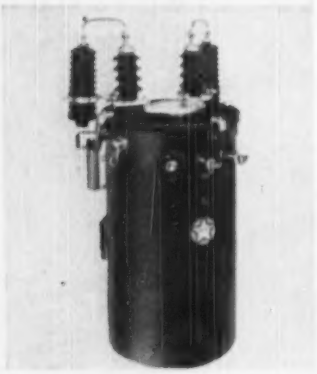
PITTSBURGH REFLECTOR COMPANY

408 OLIVER BUILDING • PITTSBURGH 22, PENNSYLVANIA

MANUFACTURERS OF FLUORESCENT & INCANDESCENT LIGHTING EQUIPMENT

Permaflector Lighting Engineers in All Principal Cities

NEW EQUIPMENT



Distribution Transformer

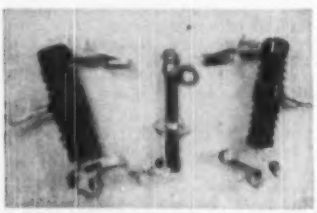
MAXIMUM PROTECTION, it is claimed, is provided in a new line of distribution transformers equipped with a combination of: (1) Thermally operated circuit breaker; (2) lightning arresters and tank discharge gaps protecting all main points of insulation; (3) protective links in the high voltage winding which prevent feeder lockouts because of faulted transformers.

Also included are a red danger overload signal, a manual-operation breaker handle for reclosing, and an emergency breaker control permitting the transformer to carry greater overloads longer.

The transformers are available in sizes from 3 kva to 100 kva, 14,400 v and below.

Pennsylvania Transformer Co, P.O. Box 330, Canonsburg, Pa.

•



Heavy-Duty Cutout

OPEN-DROPOUT cutouts with heavy-duty interrupting ratings of 5,000 amp are available in 5.2 and 7.8 kv maximum ratings.

The manufacturer's standard 5.2 and 7.8 kv cutouts already in service can be converted to these heavy-duty cutouts by replacing the standard fuseholder to the new interchangeable heavy-duty fuseholders.

Close coupling of the fuseholder and insulator to reduce recoil stresses on the porcelain, and a fuse holder sealed at the upper end to prevent power arcs and flashover, are features of the cutouts. To eliminate arcing at the silver-plated contacts, there is a time delay of 5 or 6 cycles for contact separation.

General Electric Co, Apparatus Dept, Schenectady 5, N. Y.

•

Hydraulic Boom

EQUIPMENT called the "industrial monkey" allows the workman to control boom movement with his feet, leaving his hands free for work. The unit consists of a single extendible steel hydraulic boom mounted on the back of a 1½-ton truck. It rises to 40 ft, revolves in a 270-deg arc, and has a self-leveling insulated platform.

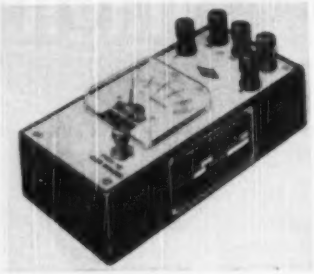
A dual set of controls in the cab of the truck permits the boom to be used as a light crane. Other uses include mid-span repairs, re-insulation, tree trimming, and painting. In the illustration, the unit behind the cab is an air compressor used for pneumatic pruning tools.

Capital Industries, Portland, Ore.

•

CT Field Test Set

CURRENT TRANSFORMER installations may be quickly checked with a field test set for short circuited turns, high resistance joints or connections or grounding, or customer tampering. There is no interruption of the customer's service during testing.



The meter has four current ranges: 1.25-2.5-5-10 amp. Set is housed in a non-conducting molded plastic case. When the case is held in the hand, all leads extend away from the operator. Thus, according to the company, there is virtually no danger of coming into contact with live parts. Complete details are in Bulletin 54.

The Eastern Specialty Co, 3617 N. 8th St, Philadelphia 40, Pa.

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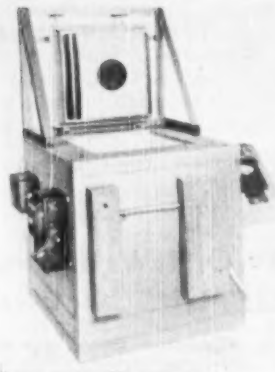
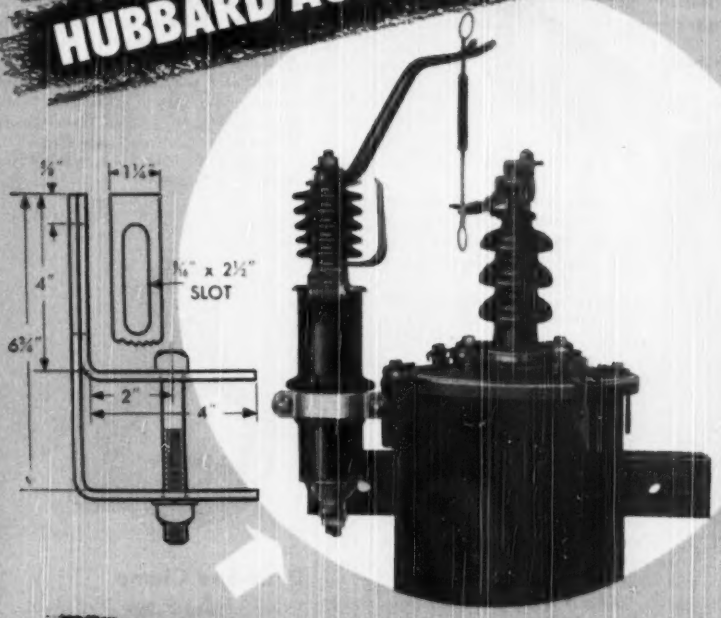


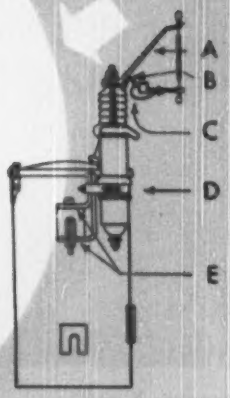
Electric Furnace

Two temperature ranges are features of a vertical electric furnace that is intended for varied industrial applications such as basket heating, steel hardening, and drying and firing of ceramics. One version of the furnace has an inside fan assembly for equalized temperatures up to 1,250 F. Another model has a maximum temperature of 2,000 F without recirculation.

Coiled heating elements are mounted in refractory plates and located on the

HUBBARD AUTOGAP FUSE KITS





* SEE LISTING BELOW.

GIVE—COMPLETE PROTECTION

Hubbard Autogap Fuse Kits provide transformer protection with external accessibility. All parts are easily inspected. The fuse link is exposed, making it easy to select the right fuse for proper coordination. Transformer and kit can be assembled on the ground and mounted as a single unit. Kits for Vertical and Horizontal Autogaps are also available for factory assembly.

*

A	Bronze Fuse Fork
B	Terminal Lug Adapter
C	Chrome Steel Spring Assembly
D	No. 2332-9kv Autogap Arrester
E	Heavy Duty Adjustable Mounting Bracket No. 2349

HUBBARD AND COMPANY

ESTABLISHED 1843

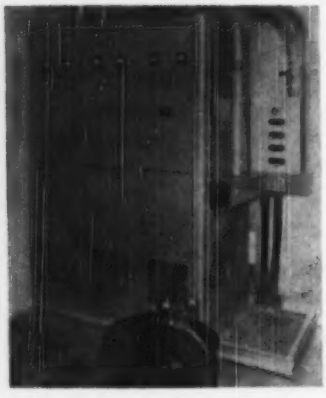
PITTSBURGH • CHICAGO • OAKLAND, CALIFORNIA

"Hang the Load on Hubbard Hardware!"

four sides of the 21x21x30 in. heat chamber. A Capacitrol unit provides temperature control. Power relays, a fused switch box, and all interconnections are factory installed. Over-all dimentions of the furnace are approximately 60x48x72 in.

K. H. Huppert Co, 6830 Cottage Grove Ave, Chicago 37, Ill.

•



Elevator Rectifiers

SELENIUM RECTIFIERS designed to provide power supplies for elevators are now available in units of 3 to 100 hp with 230 and 500-v dc output ratings. A regeneration control for high speed gearless traction drives permits use of the rectifiers as power suppliers for all types of motors, according to the manufacturer.

Units consist of cooling fan motor, selenium rectifier plates, heavy duty transformers, complete wiring, and regeneration control if necessary. One of the big advantages of these units, states the manufacturer, is that they can be installed in a short time so that the elevator shut-down period is cut considerably.

Industrial Electronics and Transformer Co, 8655 S. Main St, Los Angeles 3, Calif.

•

Gas Torch

CALCULATED flame temperature of a portable LP (liquified petroleum) gas torch is 3,660 F. One model produces a flame adjustable from pinpoint size up to 2-in. length inner cone; the other gives a brush type flame adjustable from 2 to 4 in. Uses include cable splicing, electrical soldering, brazing, aluminum welding, sweating fittings, soldering battery cable lugs, etc.

No pumping or pre-heating is needed, the manufacturer reports, and it burns

in any position—even upside down. One "cylinder refill" of propane fuel operates the torch for 12 hr or more. Fully loaded, the cylinder weighs under 2½ lb.

The Otto Bernz Co, Inc, 280 Lyell Ave, Rochester 6, N. Y.

•

Hinged Lighting Standards

HINGED street lighting standards are advantageous because the luminaires may be lowered to street level for servicing. When raised, the hinged section is bolted to the lower section and secured with a padlock to prevent unauthorized removal of the nut. The standards may be adapted to either multiple or series circuits.

Heights available range from about 22 ft to 33 ft, with mast arms extending 4, 6, or 8 ft. They are 10-gage steel, furnished with or without sub-base of ¼-in. steel plate with removable doors to facilitate installation of transformers.

Revere Electric Mfg Co, 6009 Broadway, Chicago 40, Ill.

•

Corrosion-Resistant Motor

CAST IRON frame, totally enclosed fan-cooled motors are now available in ratings from 5 hp to 250 hp. They are suitable for chemical plants, oil fields, petroleum refineries, and other industries where corrosion is a problem. Both a standard and an explosion-proof model are available in each rating.

Frame, endplates, blower shield, and conduit box are cast iron, while the blower is malleable iron (non-sparking bronze in the explosion-proof model). A double-dip varnish job topped by a coat of acid and alkali resistant varnish protects the stator windings. Stator laminations are isolated from the air stream by a cast iron inner frame.

Wagner Electric Corp, 6400 Plymouth Ave, St. Louis, Mo.

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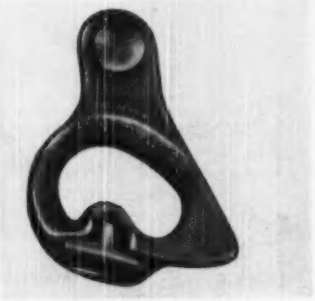


Dead-End Clamp

MAJOR design change in the company's envelope type, dead-end clamp is the J-bolt keeper which has been made extra long, thereby doubling the gripping area on the conductor. This keeper is said to contact all wires in the long-lay conductors and hold them without damage to conductor wires. Cable seat accommodates conductors from 0.16 to 0.375 in. diam inclusive. Ultimate strength of clamp is 8,000 lb.

The Porcelain Insulator Co, Lima, N. Y.

•

Lighting Units

NETWORKS of slimline and fluorescent illumination, the manufacturer states, may be formed in curves and angles of any degree with the Plexoline system. Three basic units making up the system are: (1) Linear sections, (2) circular accent units, and (3) adapter fittings. Circular accents provide a pivot for the linear sections so that any desired angle may be formed.

The 2-light system lists 8 and 4-ft sections for slimline and fluorescent lamps, and 6-ft sections for slimline lamps; the 4-light system lists, respectively, 4-ft sections, and 8 and 6-ft sections.

Luminous side circular units are available in 15 and 24-in. diam, using, respectively, a 150-w lamp and a 200

MORE NEW EQUIPMENT

Just Received

Appearing Next Issue

OUTDOOR SERVICE CENTER
For farm wiring where pole metering is or is not feasible

DISTRIBUTION SYSTEM CUTOUT
Glance tells if opened as disconnect or protective operation

SILVER PLATING UNITS
Two electrodes adaptable to plating contacts on the job

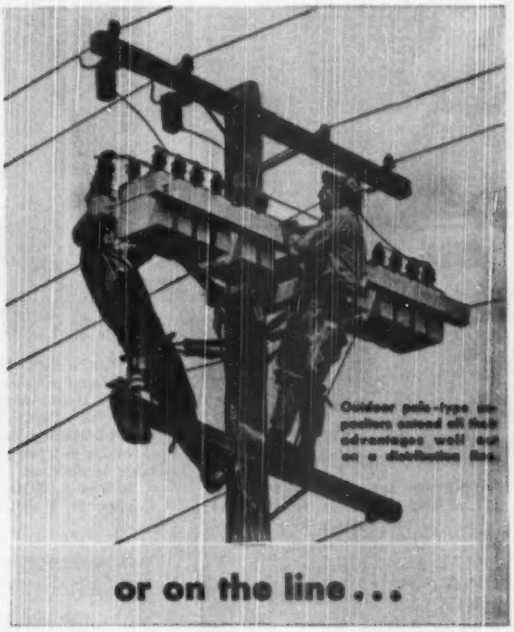
UTILITY TRUCK BODIES
Multiple-choice standard auxiliaries, optional items available

YOU CAN BE **SURE**.. IF IT'S

Westinghouse

Three 900-kvar equipments, three-connected and automatically switched in three steps in response to voltage level.

At the substation . . .



Outdoor pole-type capacitors extend all their advantages well out on a distribution line.

or on the line . . .

Make way for the Payload!

Capacitors provide the lowest-cost method of gaining extra circuit capacity . . . and now cost less than ever before . . . in some ratings as low as $3.60 per kvar. So, *now* is the time to make way for the payload . . . to release wasted circuit capacity for more kilowatts. And in the complete line of Westinghouse Inerteen Capacitors, you'll find the right equipment for the job.

From individual unit installations on primary distribution lines, to completely housed equipments for substation banks you can be *sure* of better performance with Westinghouse Capacitors—whether the application be power-factor correction, voltage control or reducing line and equipment losses. But, for any application, check first with Westinghouse.

Our years of close co-operation with utilities have given us broad experience in applying capacitors to many conditions. We'd like to apply it to your problem.

For complete information call your local Westinghouse office, or write for Booklet B-4343. Address: Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Penna. J-60717

GET THESE TIME-PROVED FEATURES

- **Inertex Insulating Paper**
- **Inerteen Impregnation**
- **Solder-Sealed Porcelain Bushings**
- **Durable, All-Welded Steel Cases**
- **Weatherproof Zinc-Spray Finish**

Westinghouse

CAPACITORS

Just Published!

TRANSIENT PERFORMANCE of ELECTRIC POWER SYSTEMS

Phenomena in Lumped Networks

1. A book which clarifies the problem of transient phenomena as they occur in today's electric power systems. Emphasizing the physical character of these phenomena, it discusses simple circuit switching and resonance, then analyzes eddy currents and commutation circuits—and such manifestations as consideration, ground-fault currents, governor interaction, line grounding, and parallel induction. Nonlinear circuit characteristics as they affect phenomena such as fuse wire, parts and interruptions, restrikes, and in-rush currents are taken up. Shorts in alternators and overvoltages of capacitive loading in generators are treated. **By Reinhold Rudenberg, Professor of Electrical Engineering, Harvard University. McGraw-Hill Electronic and Electronic Engineering Series. 832 pages, 734 illus., 6 x 9, $12.00**

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3. Electrical World's valuable survey of the development and potential of modern electric systems, covering energy generation, distribution and utilization. Brings you in compact form the unique record of the development of hydro- and turbo-electric power plants—of techniques for the construction, operation, and maintenance of far-flung systems—of public regulation over companies—of the rise of industry organizations. Outstanding specialists contributed their knowledge to make this volume a unique log of industry achievement. **Compiled by the editors of Electrical World. 186 pages, 8½ x 11, over 200 illus., $3.50**

ELECTRIC DISTRIBUTION FUNDAMENTALS

4. This second edition gives sound solutions to problems of electric distribution essential data on design and construction, operation and service, methods and equipment and mechanics and materials. Discusses how the distribution system works—how it is planned, designed and constructed—how service and operating routine is handled. Covers voltage drop, wire size calculations, transformer connections, etc. **By F. Bonford, Copper Wire Eng'r. Assoc. 252 pages, $3.50**

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Position W-7-31-50

This offer applies in U. S. only.

or 300-w lamp. Additional information is in a booklet, Form DB-28.

Day-Brite Lighting, 5425 Bulwer Ave, St. Louis 7, Mo.

•

OSCILLOSCOPE TRACING DEVICE—Cathode-ray patterns of a repetitive nature may be traced directly on graph paper with the Oscillo-Tracer, an optical superpositioning device. Setting up photographic equipment for but one oscillogram is obviated.

Robert A. Waters, Inc, Dept EW, 4 Gordon St, Waltham 54, Mass.

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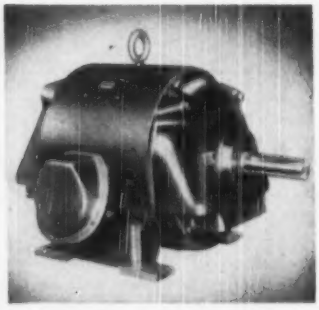


Splash-proof Motors

Squirrel-cage motors, splash-proof type CSP Life-Line, are designed for constant speed applications indoors or outdoors. They are said to be protected from dripping or splashing liquids by solid rolled-steel frames and baffles in the end brackets. Typical applications include boiler rooms, chemical plants, and food-processing plants. Bearings are prelubricated. They are available from 7.5 to 100 hp; 60, 50 or 25 c; 208, 220, 440, 550, and 2,300 v.

Westinghouse Electric Corp, P. O. Box 2099, Pittsburgh 30, Pa.

•

Combustion Control

An electronic flame rod projecting into the fire chamber of a gas pilot instantly cuts off fuel if the pilot fails. The electronic rod responds to the flame itself. On lighting, the pilot flame must first be proved before the rod permits the main gas valve to open.

Designed to operate on 115 or 230 v, 50/60 c, the rod has a load rating of 1 hp for the power contacts plus 125 va pilot duty. Ambient temperature is 32 F to 125 F. The rod is part of Fireye System FF-6, and is further described in Bulletin CG 4751.

Combustion Control Corp, 77 Broadway, Cambridge 42, Mass.

MORE NEW PRODUCTS

about which you should know

Blackhawk Industries, Dubuque, Ia., has added a conduit **entrance cap** to its line; cap is non-corrosive, and holes and screws are filister head. . . . Atlas Industrial Corp, 849 39th St, Brooklyn 32, N. Y., has a marquee **serviceer** for overhead lighting, cleaning, and maintenance. It is 6 ft, 8 in. and raises to 11 ft, 6 in.; it is hand-operated.

Remcraft Products, Cleveland, Ohio, has designed a **swivel connector** which permits electrical connections to rotate freely and continuously, right or left, without interruption; for 2, 3, or 4-wire circuits. . . . Ideal Industries, Inc, 1021 Park Ave, Sycamore, Ill., is making a new **Wire-Nut** for use in lighting fixtures up to 1,000 v, or up to 600 v in other manufacturing applications.

Combustion Control Corp, 77 Broadway, Cambridge 42, Mass., is producing a photoelectric **flame failure safeguard** system FF-3 for manually ignited and semi-automatic industrial oil burners. . . . Photoswitch, Inc, 77 Broadway, Cambridge 42, Mass., offers an **electronic timer,** Series 30, for process control and machine timing.

Universal Winding Co, Box 1605, Providence, R. I., has introduced No. 107 high-speed automatic **winder** for paper-insulated and acetate-insulated coils; speeds up to 2,500 rpm. . . . General Electric Co, Nela Park, Cleveland 12, Ohio, has a 300-w narrow-beam **spotlight** lamp of the all-glass sealed beam type; beam candlepower is about 100,000.

Morrison Steel Products, Inc, Buffalo, N. Y., is producing two new models of its Carry-All—an all-steel, all-purpose service and **utility truck body.** They fit standard ½, ¾, and 1-ton truck chassis. . . . Irvington Varnish & Insulator Co, Irvington

Because IT *MUST* BE RIGHT

You can count on

TRIANGLE

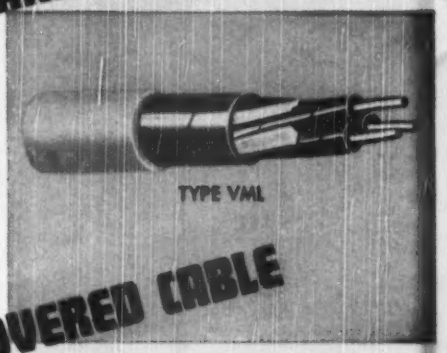
You can see for yourself that it takes massive machines to turn out lead covered and high voltage cables to meet today's rigid specifications. But machines alone cannot do the job: behind them must be men of many years' experience in making cable — in making it *right*.

At Triangle's efficient New Brunswick plant you will find modern machines manned by true craftsmen, checked by rigorous inspection, backed by unceasing development and research. To you, this means the finest in parkway...power...varnished cambric ...lead covered cables that can be constructed — today's top value in wire and cable.

Whether your needs are for standard cables built to I.P.C.E.A. recommendations, or for special cables tailor made to your own specifications, you will find Triangle engineers glad to consult with you.

TYPE RLJFJ

PARKWAY CABLE



TYPE VML

LEAD COVERED CABLE

TYPE V

VARNISHED CAMBRIC CABLE

Protection Plus—This huge press produces a smooth, uniform sheath of virgin lead for utmost cable protection.

The Trade Mark Of Top Value

TRIANGLE CONDUIT & CABLE CO., INC.

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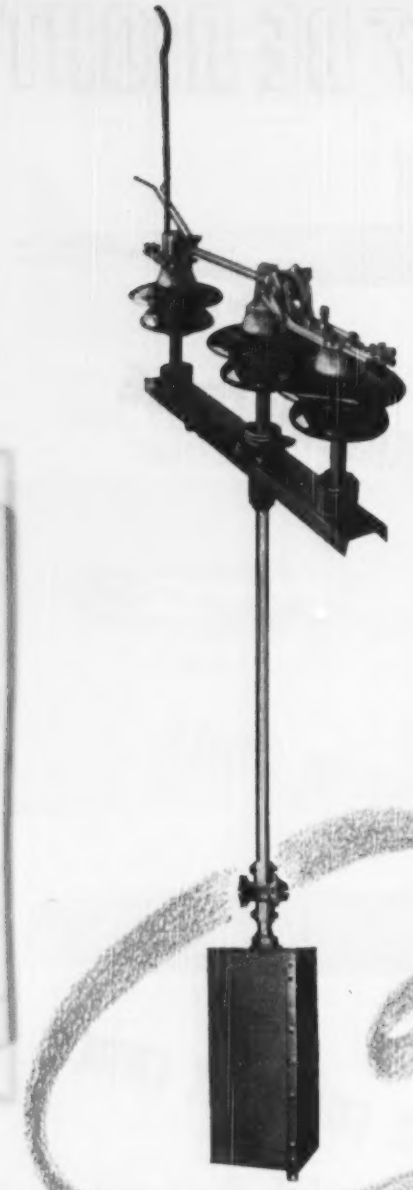
GLAZON BUILDING WIRE • BARE WIRE • ARMORED CABLE • GLAZON NON METALLIC SHEATHED CABLE • SERVICE ENTRANCE, SERVICE DROP, VARNISHED CAMBRIC BRAIDED OR LEADED, TRIOPRENE TRENCH, POWER AND PARKWAY CABLES • RIGID CONDUIT HOT DIPPED GALVANIZED • ELECTRIC METALLIC THIN WALL CONDUIT • FLEXIBLE STEEL CONDUIT



New

★ A completely dependable, automatic operating mechanism for air-break switches, it requires no outside source of power. It draws current from a battery to actuate the solenoids and relays. It uses the instantly available pressure of compressed nitrogen to open and close your switches.

This new mechanism is adaptable to a variety of chores. Use it to sectionalize transmission lines . . . disconnect branch lines . . . transfer loads from one power source to another. Or you can make any variation on these three basic schemes by using standard relays. The current for the relay coils is .6 amperes at 6 volts.

Maintenance of this new mechanism is easy. Routine inspection will tell you when to change gas cylinders. But you can figure on 25 to 30 complete operating cycles before that's necessary. The battery recommended will hold 85% of its charge for a whole year, and will last about ten years.

Let your Joslyn Representative give you the whole story. Call him today or write: Hi-Voltage Equipment Company, 4000 East 116th Street, Cleveland 5, Ohio.

HI-VOLTAGE

Gas-Operated Mechanism

HOW IT WORKS

1-The mechanism is energized for operation by a relay or a pushbutton.

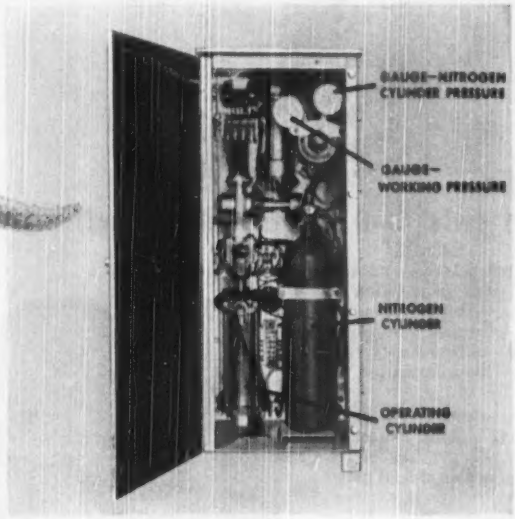
2-Main magnetic valve opens.

3-Either opening or closing valve opens simultaneously with main valve.

4-Gas is admitted at either one end or the other of the operating cylinder. Adjustable needle valves regulate the speed.

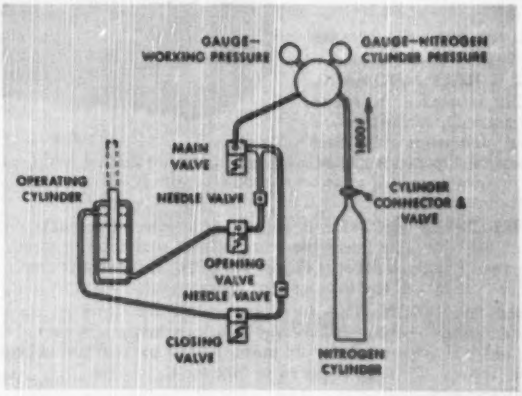
5-Limit switches deenergize valves at end of operation and set circuits for next operation.

Note: For emergency operation, the mechanism may be fitted with a handle for manual control.



SPECIFICATIONS

- Size: 32" high, 13" wide, 11" deep.
- Three sizes of operating cylinders available to provide 250, 400 or 500 ft-lbs of operating effort.
- Operating time—3 seconds.
- Stainless steel spring holds switch in open or closed position.
- Completely enclosed in a heavy-gauge metal case.

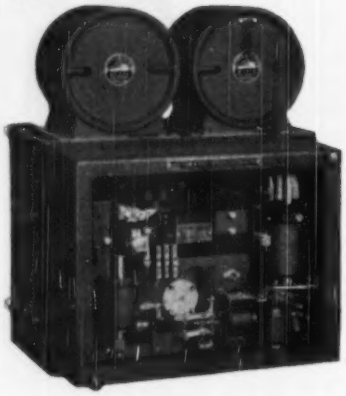


EQUIPMENT COMPANY

4000 EAST 116TH STREET · CLEVELAND 5, OHIO

Lightning-Fast Records..

..with this G-E Automatic Oscillograph type PM-13



In one quarter cycle this automatic instrument goes into action. It provides you with detailed, graphic records of how your power system behaves under all fault conditions. This information can help you—

1. Reduce loss of service. Faults are more quickly located for repair
2. Save money on special patrol expense
3. Detect minor faults before they cause major damage
4. Determine causes of system instability
5. Supervise relay and breaker operation.

THE PM-13 IS FULLY AUTOMATIC. No operator is needed. It starts (in 1/240 second), records entire disturbance, and stops after fault has been cleared. Operation can be initiated by any device that will break a circuit, so it is suitable for use at an unattended station. It will make 100 oscillograms without attention.

CLEAR, WELL-SPACED RECORD. A special arrangement prevents crowding at the start, and the lamp burns more brightly at that time to assure a clear starting record. The trace paper is 4¼ inches wide. This permits ample separation of traces yet avoids the high cost of wider paper.

DEPENDABLE OPERATION. This oscillograph operates from its own power source (automatically kept at full voltage). During the standby period the only part energized is the light source—no moving parts to wear out or require attention. No special skills are required to care for it.

MORE ADVANTAGES—Built-in alarm contacts, adjustable recording time (two to twenty seconds), and time-stamp identification (date, hour, and minute of record) are just some of the other reasons why you'll appreciate every PM-13 in your system. You can order now from your nearest G-E representative. Or, if you want more information, write for Bulletin GEC-396. *Apparatus Dept., General Electric Company, Schenectady 5, N. Y.*

GENERAL ELECTRIC

11, N. J., is manufacturing No. 123 **insulating varnish** which is said to stay flexible after baking; for use in impregnating transformer and similar coils.

Precision Engineering & Mfg Co, 248 Center St, Saginaw, Mich., has developed a butane-propane **gas torch.** It weighs 4 lb, generates heat up to 2,200 F. . . . Federal Electric Products Co, 50 Paris St., Newark, N. J., has announced the Noark 11-amp main and range **pull switch,** primarily for residential installation.

George Ulanet Co, 417 Market St, Newark 5, N. J., has added an immersion heater **thermostat** for control of liquid and air temperatures; rating is 1,500 w, 115-230 v, ac; ranges available for −100 F to 700 F. . . . M. E. Cunningham Co, 125 E. Carson St, Pittsburgh 19, Pa., has a hand **stamping fixture** for marking metal name plates; after each stamping it is pulled away from the plate by a spring return.

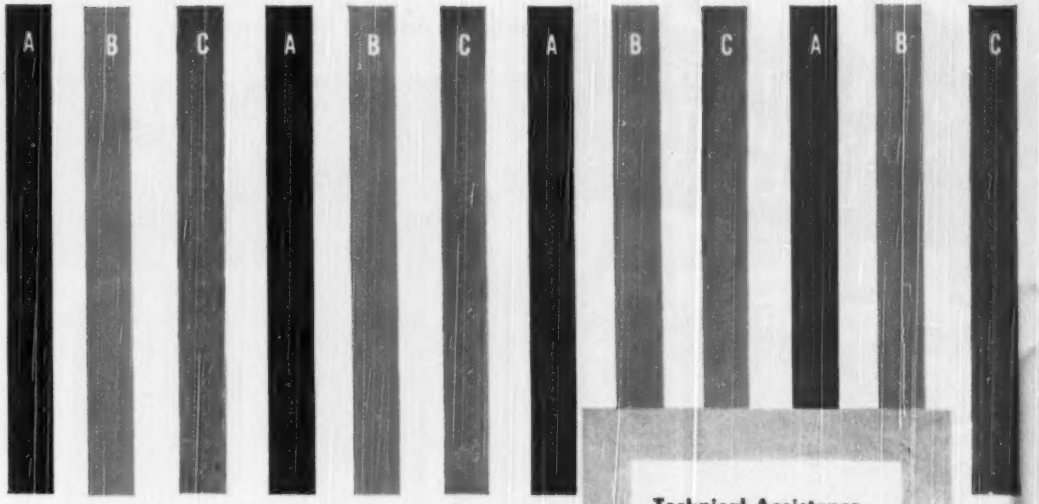
Sylvania Electric Products, 60 Boston St., Salem, Mass., has a 96-in. shielded four-lamp slimline fluorecent lighting **fixture,** CL-496, designed as a companion to the 2-lamp unit; contains four T-12, single-pin, 75-w lamps. . . . Ark-Les Switch Corp, 31 Water St, Watertown 72, Mass., offers the Series 2800 rotary snap **switch** in a wide variety of circuit sequences for application to electric heating equipment, computing machines, and appliances; rating is 15 amp, 125 v ac.

Durakool, Inc, Elkhart, Ind., has announced three technical advances in manufacture of its metal-clad mercury **switches** and timer-relays. These are use of a (1) "cleaner" mercury, (2) "higher arc" ceramic, and (3) a metal conditioning process which is claimed to reduce resistance.

Leach Relay Co, 5915 Avalon Blvd, Los Angeles 3, Cal., has added a mechanical latching type **relay,** No. 9061, to its line. It utilizes midget relays as basic components; contacts are rated 8 amp, 115 v ac or 10 amp, 24 v dc. . . . E-Z Code Div, Western Lithograph Co, 604 E. Second St, Los Angeles 54, Cal., offers a heat resistant **wire marker** said to withstand temperatures of 400 F.

Air Reduction Sales Co, 60 E. 42nd St, New York 17, N.Y., has added three new styles of **welding gloves** labeled A, B, and C, to its line; information is in Catalog 13. . . . Irvington Varnish & Insulator Co, 6 Argyle Terr, Irvington 11, N.J., has a new **insulating varnish,** No. 1100, that is said to permeate deep coil layers and form a solidly bonded winding. Its solvent is said not to attack magnet wire.

BUS CONDUCTOR DESIGN FACTORS and PROBLEMS



No. 4 Interlaced Busses

Where extremely heavy alternating currents must be carried at low voltage and where excessive voltage drop must be avoided, an interlaced construction may be used. In this construction the conductor is broken up into a number of parallel circuits, each carrying a part of the total current and each conductor interlaced with the opposite polarities, keeping the minimum space between phases.

Our Technical Department can help you plan and obtain bus equipment for any requirement. Ask for the booklet, "ANACONDA Copper Bus Conductors" which discusses many bus conductor design factors and problems. The American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ont.

Technical Assistance in Bus Conductor Practice

For many years, Anaconda has contributed to progress in bus conductor design, manufacture and application. Today ANACONDA *products and technicians are cooperating effectively throughout the entire field of power generation, distribution and application to provide bus conductors that will afford maximum capacity, security and economy for any specified job.*

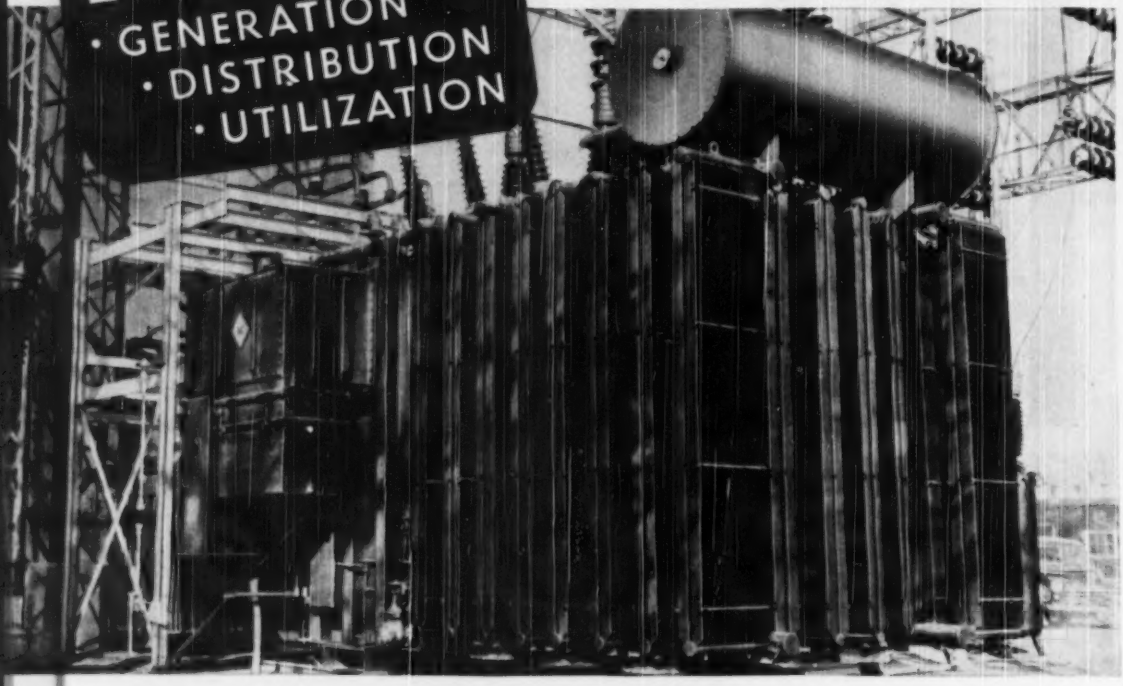
Carry the load with ANACONDA® Bus Conductors

Trends in POWER

· GENERATION
· DISTRIBUTION
· UTILIZATION

HERE ARE THREE answers from Allis-Chalmers to demands for efficient and economical equipment in the face of high fuel, labor and construction costs.

These installations illustrate the advanced design Allis-Chalmers builds into all major apparatus for the electric power industry. In making your plans for replacement or expansion, it will pay you to call your nearby A-C representative.



Operating Flexibility Obtained in New Transformer Installed by The Empire District Electric Co.

The Empire District Electric Company has just completed installation of this 201 ton Allis-Chalmers generating station transformer used with their new turbo-generator for unit operation at the Riverton Steam Plant. It steps up the generator voltage to 69, and either 161 or 132 kv to feed into their transmission system. This transmission system interconnects at 132 kv with Kansas Gas and Electric Company and at 161 kv with Arkansas Power and Light Company.

Because of parallel circuits in the generating plant substation, special engineering was needed. Also, the multiple windings were designed for 40,000 kva at voltages of 161, or 132, 69 and 13.2 kv. In addition, it was necessary to incorporate a 4300 kva series transformer for load ratio control of the 161 or 132 kv connection.

Basically it was a problem of applying existing design knowledge to a new and larger problem. It's further assurance of Allis-Chalmers ability to engineer power transformers in any rating to fit any system need.

A-3117

PROSPER with POWER!

America's strength, prosperity and good living have been paced by rapidly expanding generation and utilization of electric power.

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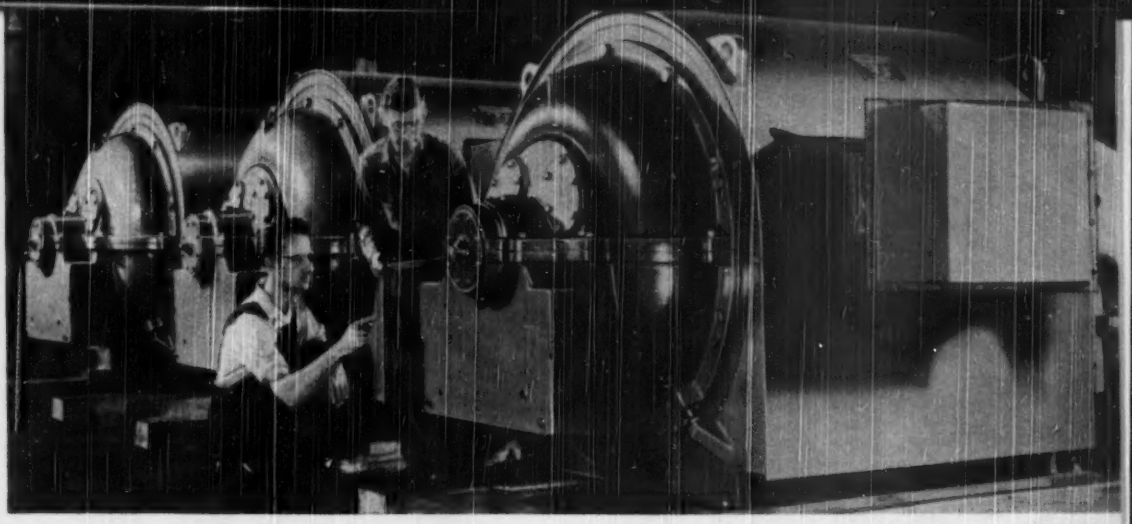
Pioneers in Power and



Largest Motors Built For Boiler Feed Pump Service

These 3500 hp, 3582-rpm motors now being installed are the largest boiler feed pump motors ever built. Reliability was the first consideration in this motor. Check some of the quality features that assure long life, uninterrupted operation:

Rotor rods of special copper and forged end rings are used to avoid embrittlement in the squirrel cage structure.

Pressure vent arrangement in bearings prevents oil leakage into stator in spite of high speed of motor.

Balancing is done in a special steel ring bolted to the end ring rather than in the end ring itself. Thus the end ring is not weakened mechanically.

Extra varnish treatment is provided to resist moisture and acids — assure long life.

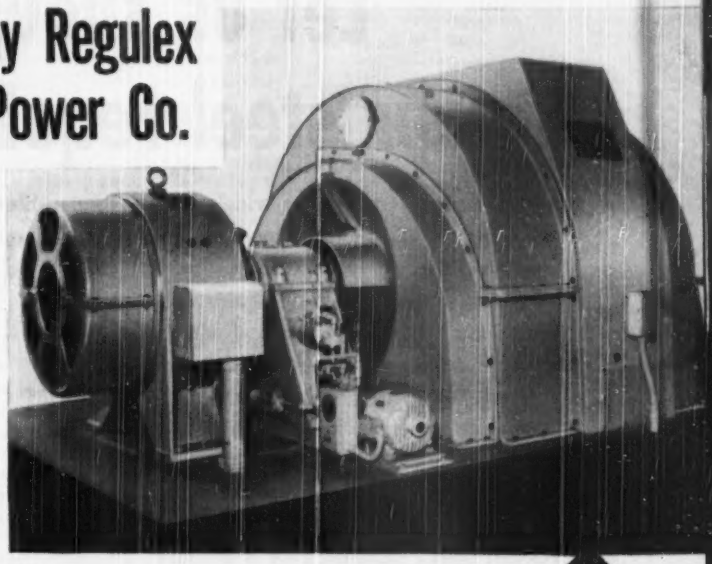
Moreover, Allis-Chalmers is equipped to supply the complete motor-pump-control package. Ask your nearby A-C Sales Office for complete information.

Voltage Improved by Regulex Control at Illinois Power Co.

Clear cut benefits explain the increasing interest in the rotating amplifier principle of regulation used in Regulex Control.

First, it provides instant response — close voltage control. In fact, Regulex Control used for voltage regulation maintains ½ of one percent sensitivity from no load to full load. Next, it eliminates the danger of a severe system disturbance causing the regulated machine to lose synchronism.

The Regulex Controlled synchronous condenser at the Vandalia Plant of the Illinois Power Company, shown right, is typical. Constant substation voltage is maintained, and disturbances caused by sudden load changes or faults are minimized.



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Our duties at Ryerson differ widely, but we all shoulder part of the same job: *supplying you with the exact steel you need exactly when you need it.*

Whether it's answering your call with a smile . . . checking for proper analysis of your steel . . . cutting or otherwise preparing your steel accurately to specification . . . delivering swiftly to your door . . . we all work shoulder-to-shoulder to take care of your every steel requirement.

Though heavy demand may still cause some shortages, our stocks remain the nation's largest. May we serve you the next time—any time—you need steel?

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STRUCTURALS—Channels, angles, beams, etc.

PLATES—Sheared & U.M. Inland 4-Way Safety Plate

SHEETS—Hot & cold rolled, many types & coatings

TUBING—Seamless & welded, mechanical & boiler tubes

ALLOYS—Hot rolled, cold finished, heat treated

STAINLESS—Allegheny bars, plates, sheets, tubes, etc.

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RYERSON STEEL

NEWS ABOUT PEOPLE

Several Advanced in Florida Power Shake-Up; Bailey Quits; Speer Back

Two new vice presidents and several other officers have been appointed by Florida Power Corp in a general realignment of executives following the selection of W. C. Gilman as president.

At a special meeting the board of directors accepted the resignation of J. F. Bailey as vice president and director of Florida Power and president and director of Georgia Power & Light Co, a wholly owned subsidiary.

Vice Presidents Picked

W. J. Clapp was named vice president in charge of operating departments and W. W. Wolff vice president in charge of divisions. Other appointments include Alex Speer, who has been director of public utilities for the city of St. Petersburg, as assistant to the president and D. B. Hyer, Jr, as commercial manager in charge of the industrial, residential, and commercial sales departments.

Clapp, a veteran of 25 years' service with the utility, has been production superintendent since he returned from active military service. He started with Florida Public Service Co as general commercial engineer in Orlando in 1925.

Wolff has been division manager of the company's operations in Winter Park for the past six years. He joined the utility in 1919. He was named the outstanding citizen of DeLand in 1943 when he was district manager there.

Speer Returns

Speer first went to St. Petersburg in 1928 as executive vice president of Florida Power. He was its president when he resigned in 1937 to become president of Virginia Public Service Co.

Three years later he became chief engineer of the power division of the Interior Department in Washington with the trustees of Associated Gas & Electric Co, which then controlled Florida Power. In 1944 he returned to St. Petersburg as head of the city's postwar plans division and later became director of the utilities division.

Hyer joined the utility in Orlando in 1927 and has held various sales and engineering positions. Most recently he has been director of the industrial development department. He is chairman of the Southeastern Electric Exchange's industrial power committee.

W. J. CLAPP

Before Gilman's appointment, it was rumored that Speer was being considered to succeed A. W. Higgins as president, but Speer said then that he had no aspirations to the presidency. In his new position he will be given various special assignments to utilize his knowledge of the utility and the city.

Bailey has been vice president in charge of operations since 1948. He joined the Florida-Georgia companies in 1930 as a Florida Power Corp division manager, was made vice president and general manager of Georgia P&L eight years later, and then became president of the latter.

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John D. Stout has been elected president of Terry Steam Turbine Co, Hartford, Conn. He succeeds **Lucius Rossiter**, who becomes chairman of the board. **Leonard C. Fogg** was elected vice president and factory manager and **A. Lindsay Thomson** secretary and assistant treasurer.

•

Roy V. Sprague, power manager of the Bureau of Reclamation's Region III, retired July 1 after 15 years with the bureau. **Wade H. Taylor**, as acting regional director, will take over his duties.

Memmott Named to Head PEA of New England

Howard W. Memmott has been elected chairman of the Power Engineers Association of New England, succeeding James L. Faden. Last year he was vice chairman of the group.

Memmott is industrial power engineer in charge of the eastern division of Connecticut Light & Power Co. He joined the utility as a lighting engineer after four years with the state of Rhode Island and in radio work at Providence. Memmott served as power sales engineer for Connecticut L&P at Danielson from 1940 to 1947.

HOWARD W. MEMMOTT

•

Daniel F. McGlinchey has been elected vice president of Phelps Dodge Copper Products Corp.

C. C. Randolph has been appointed personnel director of Western Electric Co, succeeding **T. E. Shea**, who has been named an assistant vice president of the American Telephone & Telegraph Co, parent company of Western Electric. Randolph has been works manager of Western Electric plants in Baltimore, Md.; Allentown, Pa.; and Buffalo, N. Y.

W. B. Farnsworth, merchandise manager of Georgia Power Co since 1941, has been appointed assistant to the president. He succeeds the late Charles S. Hammond. Farnsworth joined the company as a buyer in the purchasing department. He held supervisory positions in the Macon, Augusta, and Rome

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divisions before becoming assistant and then merchandise manager. **Howard Wilson,** assistant merchandise manager, has been appointed merchandise manager, succeeding Farnsworth. **R. L. Brooks,** commercial sales supervisor, has been made assistant merchandise manager.

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General Electric Names Apparatus Sales Officers

Francis E. Fairman has been appointed general sales manager of Large Apparatus Divisions and Arthur W. Bartling general sales manager of Small Apparatus Divisions in General Electric Co's Apparatus Department. Both the positions are newly established.

William S. Ginn will succeed Fairman as manager of sales of the Transformer and Allied Products Divisions, with headquarters in Pittsfield, Mass. Bartling's former post as manager of sales of the Fractional-Horsepower Motor Divisions, Fort Wayne, Ind., will be taken over by Robert C. Hanna.

A. K. Bushman, manager of the application and service engineering divisions of the Apparatus Department, has been appointed manager of industry divisions in the sales organization, another new job. Horace Zimmer, New York district manager for the department, has been made manager of districts. Frank A. Faron, who has been the New York district's industrial divisions manager, will succeed Zimmer as New York district manager.

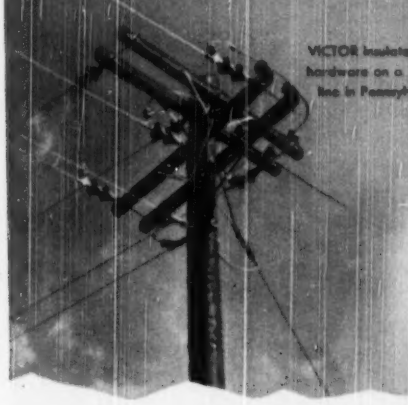
Fairman's headquarters will be in Schenectady, N. Y., and Bartling's in Lynn, Mass. They will be responsible for matters relating to product selling policies, practices, and progress in their divisions.

Fairman joined GE in 1923 as a requisition engineer at the Baltimore Works and later served in the Switchgear Divisions as sales manager of the panel and equipment division and assistant manager of the divisions. From 1945 to 1949 he was vice president of Food Machinery & Chemical Corp.

Bartling joined GE in 1919 and almost immediately went into fractional-horsepower motor sales. He has been assistant manager of the fractional-horsepower section of the Motor Divisions and manager of the Fractional-Horsepower Motor Division.

Ginn has been assistant sales manager of the Transformer and Allied Product Divisions since last September. He joined the company in 1936 and has served as manager of the Power Transformer Sales Division. Hanna, who has been assistant manager of sales for the Fractional-Horsepower Motor Divisions for the past three years, joined GE in 1929. From 1943 to 1945 he headed the

ANOTHER VICTOR INSULATOR THAT SAVES AS IT SERVES



VICTOR insulators and hardware on a 12 KV. line in Pennsylvania

ONE SOURCE: VICTOR

For distribution insulators and line hardware

YES, you can rely on VICTOR *alone* for *all* your distribution insulator and line hardware requirements . . . from pintype, spool, guy strain and dead-ending insulators, to strain and angle clamps of the highest quality. And, when you standardize on VICTOR, you—

CUT DISTRIBUTION COSTS 2 WAYS

1. *Less maintenance*—because these distribution insulators are ruggedly designed and made of the best "high voltage" porcelain to give you continuous, *trouble-free* performance under *all* kinds of operating conditions.

2. *Fewer replacements*—because each distribution insulator is thoroughly inspected and rigidly tested at *every* point of manufacture. This *guarantees* you top performance on-the-job.

So, on your next distribution job, standardize on VICTOR.

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Self priming and interchangeable, Subox & Subalox lend themselves to simplified maintenance paint systems. All varieties have a distinctive basic pigment, **chemically active** suboxide of lead (Pb_3O_4).

Subox paints provide maximum protection — are available in a range covering the electrical industry:

Transmission — Subalox, resembling galvanizing in appearance, is effective for weathered galvanized towers — spot or single coat.

Substations — Try Subox High Gloss Enamels for transformers and switch gear. Subalox varieties adequately maintain meters, fences, etc.

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FAIRMOUNT PLANT, HACKENSACK, N. J.

fractional-horsepower motor section of the War Production Board.

Bushman will supervise the agency and distributor; aircraft, federal, and marine; central station; industrial; and transportation divisions and will continue his present responsibility for the application, service, and construction engineering divisions. His headquarters will be in Schenectady.

•

G. H. Thompson Elected New President of CEA

G. H. Thompson, vice president of Montreal Engineering Co, has been elected president of the Canadian Electrical Association. He served as a CEA vice president last year.

Other officers elected were T. Ingledow, Vancouver; F. L. Lawton, Montreal; and C. I. Bacon, Cornwall, Ont., vice presidents; W. Booth, Montreal; treasurer; and B. C. Fairchild, managing director. The retiring president is E. D. Gray-Donald.

•

New Assignments

Perry T. Coons, who has been in sales work with American Steel & Wire Co for 40 years, has been appointed assistant to the sales vice president of the United States Steel subsidiary. . . . **Kenneth Oxley,** supervisor of Dayton Power & Light Co's electric operations department, has been named manager of that department. **Robert Isenhart,** supervisor of purchases,' was made manager of a new purchasing and stores division. . . **Ralph L. Warren** has been named chief engineer of the Plainesville, Ohio, municipal light plant. He succeeds **John Swanson,** retiring after 20 years in the department and eight as chief engineer. . . **Duane R. Totten** has been named manager of employee and community relations for Locke, Inc, Baltimore. He has been manager of labor relations for Telechron, Inc, Ashland, Mass. . . **Jack D. Grace** now is in charge of advertising and publicity at Nordberg Manufacturing Co. **Delbert Kay,** who has held this post, is retiring later this year.

•

E. W. Hodgetts has been named assistant manager of sales promotion by the Cincinnati Gas & Electric Co. He had been assistant manager of the publicity department.

Albert Kaye has been appointed head distribution engineer for the Western division of the Puget Sound Power & Light Co at Bremerton, Wash., to succeed the late Floyd Lesa. A Washington State College graduate in 1939, he has been with the company since except for wartime service as a major in the Army Engineers. **Herbert L. Irvin** moves up to Kaye's former position of distribution engineer. Irvin joined Puget Power in 1946 as a field engineer.

L. A. Pagano has been appointed engineering consultant in the sales department of the utilities and industrial division of Sangamo Electric Co, Springfield, Ill. He will work with various district sales offices as a liaison between the home office and the field on meter engineering problems. Before joining Sangamo, Pagano was with Consolidated Edison Co, New York, for 29 years.

Samuel L. Friedman has been named directors of public relations for the Los Angeles Department of Water and Power, succeeding the late Leo W. Barclay.

Alfred J. Wheeler, process engineer for Consolidated Edison Co of New York, who is considered an authority on coal characteristics, has retired after 43 years with the system. Wheeler joined New York Edison Co's operating department in 1907. He has been superintendent of the East River and Hell Gate generating stations in New York City.

H. P. Sedwick, vice president of Public Service Co of Northern Illinois, has been elected president of the Western Society of Engineers. **Ralph S. Peterson,** engineer with Commonwealth Edison Co, Chicago, was one of three engineers to be honored with service awards.

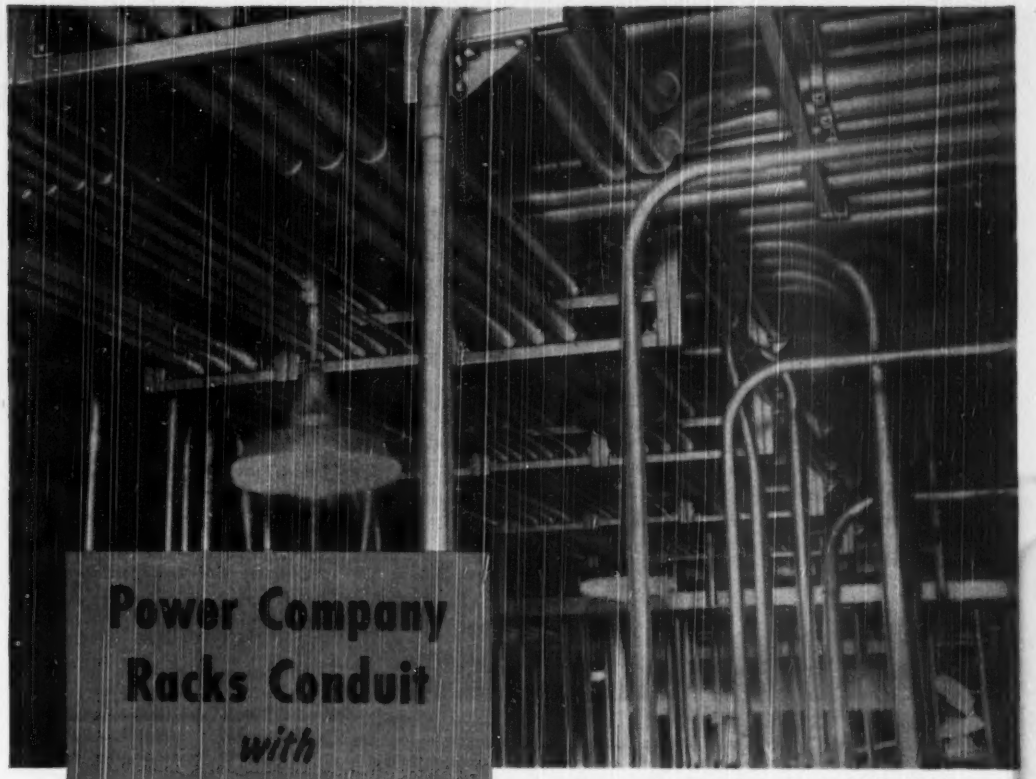
William C. Lindsey, Eureka, has been elected president of the Florida Rural Electric Cooperatives Association. He is a director of Clay Electric Cooperative and chairman of the legislative committee of Florida Municipal Utilities.

W. J. Goerisch has been appointed manager, power apparatus sales, for Graybar Electric Co. He will be succeeded as manager, lamp sales, by **B. P. Van Inwegan,** who was manager, supply specialty sales.

OBITUARY

Charles A. Beal, 79, a former executive of General Electric Co and International GE, died July 18 in Montclair, N. J., after a long illness. He retired in 1931.

Henry Cudroff, 55, since 1941 a structural engineer for Ebasco Services, Inc, died July 16 following a heart attack.



Power Company Racks Conduit with UNISTRUT!

Above picture shows an exceptionally compact and well designed installation in the Dan River Steam Plant of the Duke Power Company.

Here's a good example of how one power company used adjustable, easily erected Unistrut all-purpose metal framing to support heavy rows of conduit. In this installation the company's own personnel utilized completely Unistrut's built-in flexibility, great strength and trim framework to erect foolproof "on-the-job" framing *where supporting members were added as the work progressed.*

Unistrut permitted the conduit runs to be installed closer together, conserved space, provided neat appearance and structural excellence—eliminated entirely the need for drilling, welding, or special tools. These are important cost-saving reasons why it will pay you to give Unistrut a trial in your business.

Unistrut is metal channel with a continuous slot along one side. You simply insert the Unistrut spring nut into the slot at approximate point where attachment of another framing member is desired, slide to exact location and bolt to Unistrut fitting. Nut is thus secured to inturned edges of slot—provides positive clamping action, prevents slippage. Unistrut includes concrete inserts, roller pipe supports, brackets, clamps, hangers and framing fittings, and many other standard parts which combine to provide the world's most flexible system of support or suspension.

Free Catalog! Write today for 24-page Catalog 500—Construction Uses of Unistrut in the Electrical and Mechanical Trades, and Free Sample of Unistrut.

The **3** *Quick Unistrut Steps*

Insert nut into slotted channel | Locate fitting and nut | Tighten bolt — it's done

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MANUFACTURERS and MARKETS

STOCKHOLDERS of General Electric Co inspect operations at their company's Oakland, Calif., transformer plant. Tour was part of program arranged for recent shareholder regional open house. Other such regional sessions, which GE now is staging in place of the traditional annual meeting, have been held in Lynn, Mass.; Bridgeport, Conn.; and Ontario, Calif.

New Method Developed for Induction Heating

A new technique for induction heat-treating of nonferrous metal strip has been reported by R. M. Baker, Westinghouse Electric Corp, Baltimore. The process is still in the experimental stage, but two 300-kw pilot line installations have been made.

The method, called "transverse flux induction heating," makes possible continuous induction heat-treatment of nonferrous metals such as aluminum, brass, copper, magnesium, and stainless steel, according to Baker. Strip is passed between two opposing laminated pole structures. The field coils, supplied with alternating current, are oppositely polarized so that flux is forced through the strip. Frequencies of from 60 to 10,000 cycles per second are used, depending on the thickness and resistivity of the strip.

Conventional radio-frequency induction heating, Baker said, is not suitable for heating nonmagnetic strip because of lower power factor and inefficiency and because the small cross section of the nonmagnetic strip intercepts only a small percentage of the flux through the inducing coil. In the transverse flux method magnetic flux is directed perpendicular to the surface and through the strip instead of along its length.

•

Westinghouse Prepared for Overnight Conversion

Westinghouse Electric Corp could start overnight to convert 68 plants to military production of more than 350 items, Pres Gwilym A. Price reports.

The company's conversion program was approved almost two years ago by the Munitions Board. It provides for production of radar and electronic devices, secret devices developed since the last war, and other military equipment.

Each plant has a key liaison man working with military officials, and to each has been assigned a primary responsibility for filling the needs of one of the military branches. A major part of the work of the research laboratories now is either secret military research or is applied directly to military needs. A special products division established more than two years ago develops advanced equipment for the armed services.

MANUFACTURING BRIEFS

Kaiser Aluminum & Chemical Corp will spend about $1 million this year to improve and increase efficiency of its Spokane aluminum rolling mill. The cold mill will be modernized, and new equipment will be purchased for the "hot line."

Brown Instruments Division of Minneapolis Honeywell Regulator Co will open its second half of 1950 maintenance and repair courses Aug 14 at the company school in Philadelphia. Designed for employees of Brown customers, the classes will be held on three, five, and 13-week bases. Training will be offered in a variety of electrical instruments.

A plant expansion program, the second within a year, has been begun by J. H. Holan Corp, Cleveland, builders of truck bodies for utilities and auxiliary equipment for municipalities and gas and electric companies. The program, which will add about 50% to the company's plant space, is expected to be completed by late fall.

Hotpoint, Inc, commercial appliance sales in the first five months of 1950 were 46% above the same period last year, according to Orrin E. Wolf, vice president of the commercial division. This contrasts with industrywide commercial cooking equipment sales, which a national survey of dealers showed to be almost 10% below the first five months of 1949.

I-T-E Circuit Breaker Co has increased prices from 5% to 10% on small air circuit breakers and associated apparatus. The rise, which partially restores the 10% cut made in 1949, was attributed to higher cost of materials and labor.

A new one-year contract between Sangamo Electric Co and 90 toolroom employees, members of the International Association of Machinists, has gone into effect. Provisions include a 3% wage increase and an improved vacation plan.

A Los Angeles superior court judge has slapped two more injunctions on discount houses for selling fixed-price ap-

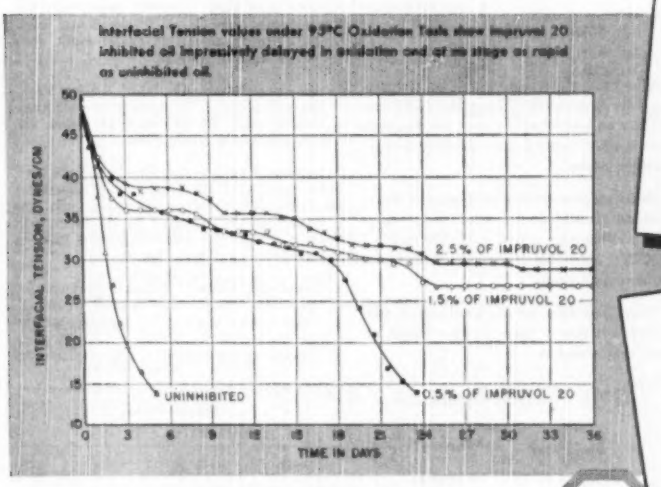
NEW ANTIOXIDANT FOR TRANSFORMER OIL . . .

KOPPERS IMPRUVOL 20

EXTENSIVE laboratory tests indicate that Koppers new liquid inhibitor, Impruvol 20, will greatly extend the useful life of transformer oils. With the addition of as little as .5 to 1.5% of Impruvol 20, the oxidation stability of new oil is increased 5 to 15 times. Similar results are shown with reclaimed oils.

DBPC—the oxidation inhibitor that has been used in turbine oils for many years—is the active ingredient in Impruvol 20. However, the Koppers inhibitor is specially compounded, and is made into an oil solution for easy application to transformer oils. Further, Impruvol 20 will stay in the oil in the presence of water.

Study the tests shown below. They will tell you, better than words, what Impruvol 20 can do. If you are interested in improving the life of your transformer oil, write for Bulletin C-O-140, to Koppers Company, Inc., Chemical Division, Pittsburgh 19, Pa.


Interfacial Tension values under 95°C Oxidation Tests show Impruvol 20 inhibited oil impressively delayed in oxidation and at its stage as rapid as uninhibited oil.
INTERFACIAL TENSION, DYNES/CM
TIME IN DAYS
2.5% OF IMPRUVOL 20
1.5% OF IMPRUVOL 20
UNINHIBITED
0.5% OF IMPRUVOL 20

TESTS ON A RECLAIMED OIL

	Time to Reach Sludge Stage	Increase in Oil Life
Uninhibited	2 days	—
0.5% of Impruvol 20 added	10 days	500%
1.5% of Impruvol 20 added	32 days	1,600%
2.5% of Impruvol 20 added	45 days	2,250%

TESTS ON A NEW OIL

	Time to Reach Sludge Stage	Increase in Oil Life
Uninhibited	5 days	—
0.5% of Impruvol 20 added	23 days	460%
1.5% of Impruvol 20 added	70 days	1,400%

KOPPERS COMPANY, INC.
Chemical Division Pittsburgh 19, Pa.

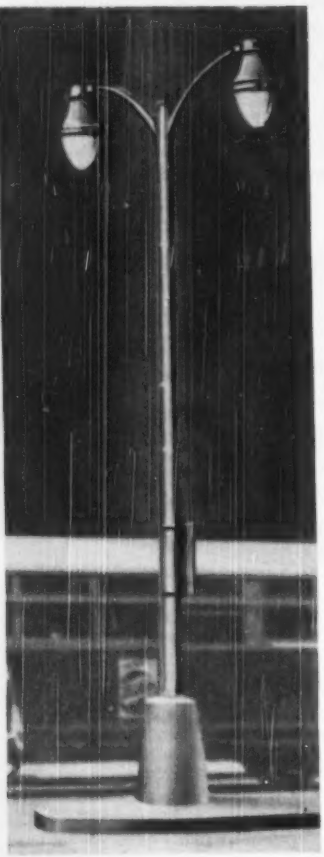
KOPPERS

THE T. J. Cope INC. REPORTER

Written by Edgar W. Baird, Jr., President, T. J. Cope, Inc., 711 S. 50th St., Phila. 43, Pa.

Cope's Street Lighting Brackets Meet the Demand for

NEWER DESIGN AND BETTER EQUIPMENT



Here you see one of the many different types of Street Lighting Brackets made by T. J. COPE, INC., in the recent past. I selected this design of one of our customers because I felt it incorporated simplicity, graceful lines, eye appeal, and at the same time, economical price—all factors which are so important today.

We have specialized for sometime in meeting our customers' particular requirements and have thereby supplied some of the largest street lighting programs in the country.

YOUR REQUIREMENTS ARE OUR STANDARDS

Whether you are enlarging or re-vamping your street lighting program, COPE can quickly and effectively meet your demands with highest quality, good delivery and attractive prices.

Knowing that users and buyers of Street Lighting Brackets are—and must be—highly discerning, I feel confident that we at COPE have the answer to their Street Lighting problems.

Won't you write for our brochure on suggested designs or give us your ideas on your requirements?

I am

As always,

E. W. Baird Jr.

President

T. J. COPE, Inc.

711 S. 50 St. Philadelphia, Pa.

pliances at reduced rates in violation of fair trade practices. Two similar injunctions were granted a few weeks ago, and more are expected to be sought soon.

SALES ASSIGNMENTS

COMPANY STAFFS

Westinghouse Electric Supply Co. New York City, has appointed John V. Flynn central New York district apparatus and supply sales manager, with headquarters at Rochester. He has been an apparatus salesman for the Wesco Rochester branch.

P. R. Mallory & Co, Inc, Indianapolis, has named Charles Gutheil manager of the Los Angeles branch. He has been sales manager of the switch division.

Anaconda Wire & Cable Co, New York City, has appointed Edward Ryan to succeed Fred Brower as manager of the New York district. Brower has been made manager of utility sales for the New York district.

Allis-Chalmers Manufacturing Corp's general machinery division has appointed three new district office managers. They are Stephen C. Bacon, Seattle district; U. E. Sandelin, Portland; and J. H. Burrus, Milwaukee. Burrus, since 1949 manager of the Portland district, succeeds H. A. Balding, who is retiring after 48 years with A-C.

Arrow-Hart & Hegeman Electric Co, Hartford, Conn., has appointed Russell A. Howland Los Angeles district manager. He formerly worked for Dayton Power & Light Co, in the construction department and as illuminating engineer.

Air Preheater Corp, New York City, has added William H. Larkin to its New York sales staff. He formerly was with the Sturtevant division of Westinghouse Electric Corp, in charge of power plant work for the eastern district.

Sprague Electric Co, North Adams, Mass., has added Leo J. Dornbos to its field engineering staff. He will work on power system apparatus applications.

Burndy Engineering Co, New York City, has appointed Jim Hennessy as supervisor of distributor sales. Hennessy, who has been with the company for 12 years, will assist distributors with stock sales training and promotion problems.

Trumbull Electric Manufacturing Co, Plainville, Conn., has named Yale T. Chaney sales engineering manager of the Eastern region and Robert C. Wilson sales engineering manager of the Central region.

Metal Prices
July 24, 1950

COPPER, Conn. V., lb	$ .22½
LEAD, N. Y., lb	.12
ZINC, prime Western, E. St. Louis, lb	.15
TIN, Straits qual, N. Y., lb	.96
ALUMINUM, base price	.17½
NICKEL, base price	.48
STEEL billets, Pitts., ton	53.00
STEEL scrap, No. 1 heavy, Pitts., ton	41.00

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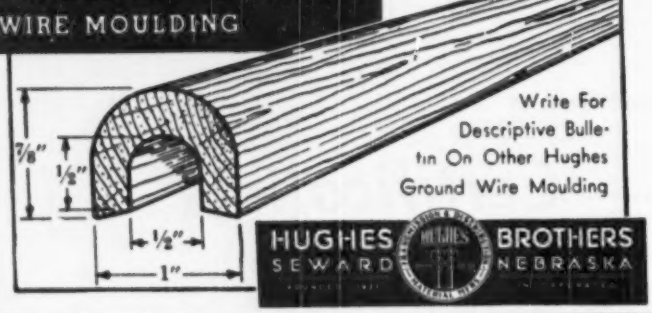

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NEW ELECTRICAL CONSTRUCTION

NEW ELECTRICAL construction projects announced by private and government utility systems involving more than $70,000. Also listed are major industrial and construction jobs where electrical work is included

UTILITIES

Proposed Construction

Arizona—Bureau Reclamation, Dpt. Interior, Phoenix, 6 current and 6 potential transformers for Blythe and Knob Substation, Davis Dam Proj., Spec. R3-PX-49 (Region 3). L. N. McClellan, Denver, ch. engr.

California—Bureau Reclamation, Bldg. 1-A, Denver Federal Center, Denver, Col., furnishing, del. f.o.b. cars shipping point or f.o.b. cars Herdlyn, optional outdoor power circuit breakers selector-type disconnecting switches, manually-gang-operated grounding blades, outdoor disconnecting switches, for Tracy Switchyard, Central Valley Proj., Spec. 3124. L. N. McClellan, Denver, Colo., ch. engr.

California—Surprise Valley Electrification Corp., Alturas, 85 mi. rural distr. lines, 22 mi. transmision lines, sys. imprvs., Modoc Co. **$330,000.**

Colorado—Bureau Reclamation, Dpt. Interior, Bldg. 1-A, Denver Federal Center, Denver, Colo., Beaver Creek Sub-station, Colorado-Big Thompson Proj., ¾ mi. east of Brush, Spec. 3126.

Florida—Withlacoochee River Electric Co-operative, Dade City, 96 mi. rural distr. lines, sys. imprvs., Pasco Co. **$325,000.**

Georgia—Cobb County Rural Electric Membership Co-operative, Marietta, 68 mi. rural distr. lines, and sys. imprvs., Cobb Co. **$300,000.**

Ga., Eastman—Ocmulgee Electric Membership Corp., Eastman, warehouse and office, Southern Eng. Co., 1000 Crescent Ave. N.E., Atlanta, engr.

Idaho — Prairie Power Co-operative, Fairfield, 74 rural distr. lines, sys. imprvs., Camas Co., **$200,000;** 176.5 mi. rural distr. lines, 42.5 mi. 33 KV transmission lines, 2 sub-stations, sys. imprvs., Cassia Co., **$670,000.**

Illinois—M. J. M. Electric Co-operative, Inc., W. H. Monke, pres., Carlinville, 151 mi. rural distr. lines, Fayette, Jersey, Macoupin, Madison and Montgomery Counties, **$685,000.**

Kansas—Coffey Co. Rural Electric Co-operative, Burlington, 70 mi. rural distr. lines in Anderson, Coffey, Franklin, Greenwood, and Woodson Counties. **$225,000.** Flora Eng. Co., 501 Jackson, Topeka, consult. engr.

Kansas—Flint Hills Rural Electric Co-operative, Council Grove, 54 mi. rural distr. lines in Butler, Chase, Dickinson, Geary, Harvey, Lyon, Marion and McPherson Counties, **$399,000.** Frank Horton & Co., Lamar, Mo., consult. engrs.

Maryland—Southern Maryland Electric Co-operative, Hughesville, 16.42 mi. rural distr. lines, 66 kv single wood pole transmission line ,one metering station, Charles and St. Marys Counties. Plans deposit $25 refundable. B. O. Vannort Engineers, Inc., 700 S. College St., Charlotte, N. C., engr.

Minnesota—Anoka County Co-operative Light & Power Assoc., Anoka, 75 mi. rural distr. line, etc., Anoka Co. **$275,000.**

Minnesota—Mille Lacs Region Co-operative, Power & Light Assoc., Aitkin, 60 mi. rural distr. line, sys. imprvs., Aitkin Co. **$145,000.**

Mississippi — North-central Electric Power Assoc., Senatobia, 637 mi. rural distr. lines, De Soto Co. **$1,130,000.**

Miss., Clarksdale — Coahoma Electric Power Assn., Coahoma, warehouse and office, $95,000. Plans deposit $10. Biggs, Weir & Chandler, 224 N. Congress St., Jackson, archts.

Missouri—Ozark Border Electric Co-operative, P. G. Winge, pres., Fifth and Poplar Sts., Poplar Bluff, 350 mi. rural distr. lines, 25.3 mi. tie lines and sys. imprvs. in Stoddard, Cape Girardeau, Dunkin, Bollinger, Scott, Mississippi and New Madrid Counties. **$740,000.**

Montana—Goldenwest Elec. Co-operative, Wibaux, 89 mi. rural distr. lines, Wibaux Co. **$150,000.**

Montana—Fergus Electric Co-operative, Lewistown, 112 mi. rural distr. line, sys. imprvs., Fergus Co., **$185,000.**

2 Great New "Rough Weather" Cables for Modern Street Lighting

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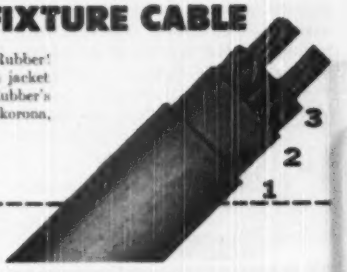
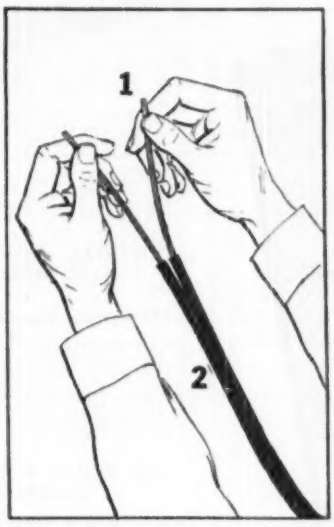
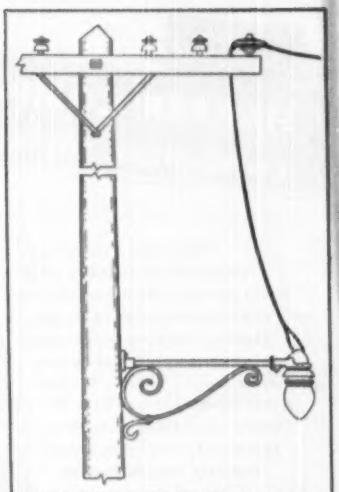


② MULTIPLE CIRCUIT "ZIP-CORD" CABLE



Unique construction allows quick separation of conductors by "zipping" the cord.

The Zip-Cord construction (1) makes installations and connections simple and quick on open drops, on series circuits, multiple circuits or secondaries of I.L.'s. Here again this cable will not festoon. The smooth Neoprene cover(2) is specially compounded for rough weather duty. Neoprene makes the wire lighter, smaller in diameter than the ordinary braid construction. The Neoprene cover lasts almost indefinitely even in areas where the weather cycles are extremely severe.



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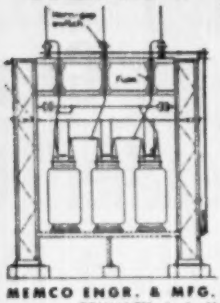

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Montana—Missoula Electric Co-operative, Missoula, 49 mi. rural distr. lines, headquarters facilities, Missoula Co. **$190,000.**

Montana—Park Electric Co-operative, Livingston, 53 mi. of rural distr. lines, Park Co. **$186,880.**

Oklahoma—Northwestern Electric Co-operative, Woodward, 388 mi. rural distr. lines, Woodward Co. **$475,000.**

Okla., Blackwell—City, power plant bldgs., imprv. grounds of Blackwell municipal power plant. $75,000. Black & Veatch, 4706 Broadway, Kansas City, Mo., engrs.

Pa., Warren—General State Auth., 18 and Herr Sts., Harrisburg, conversion electrical sys. from direct current to alternating current at Warren State Hospital. $400,000. Plans deposit $10. Extended date. Harry B. Joyce, 616 Commerce Bldg., Erie, engr.

South Dakota—Central Electric Co-operative Assoc., Blunt, 281 mi. rural distr. lines and sys. imprvs., Hughes Co. **$387,000.**

Tex., Houston—Electric Land Co., 1014 Nagle St., warehouse. **$100,000.** R. C. Newsome, 1304 Sul Ross St., consult. engr.

Washington—Molson-Chesaw Electric Corp., Molson, 135 mi. rural disrt. lines, Molson Co., **$265,000.**

Wash., Seattle—City, County-City Bldg., 6 transformers for City Light Sub-station, Bothell, $1,200,000. E. R. Hoffman, Seattle, engr.

Wyoming—Bridger Valley Electric Assn., Mountain View, 137 mi. rural distr. lines, generating facilities, conversion and sys. imprvs., completing previously approved constr., etc. Uinta Co. **$660,000.** T. C. Adams, Union Pacific Bldg. Annex, Salt Lake City, Utah, engr.

Low Bidders & Contracts Awarded

Iowa—Corn Belt Power Co-operative, Humboldt, steam generating plant, Sect. 8, electrical work to Boese-Hilburn Electrical Co., 122 W. 8 St., Kansas City, Mo., **$90,753**; Sects. 7 and 9, building and mechanical work, to Winger Constr. Co., 1200 E. Main St., **$309,500** and **$180,693** respectively. Grand total $580,946.

Mass., Bedford—Commonwealth of Mass., Airport Management, General Logan Airport, East Boston, July 6, high intensity lighting sys., medium intensity lighting sys., vault, appurtenant misc. work, Proj. T-105, Laurence G. Hanscom Field, from W. H. Gens & Son, 210 Purchase St., Boston, **$82,483,** Thompson-Lichtner Co., Inc., 8 Alton Pl., Brookline, engr.

Mo., Essex—Southwestern Power Admin., Dpt. Interior, Drawer 619, Tulsa 1, Okla., 161,000 volt sub-station, to T. J. Robertson Co., Jonesboro, Ark., **$149,820.** Awarded 6/28.

O., Paulding—Paulding Electric Co-operative, Paulding, erect 3 sub-stations and rephasing, to Davis-Hydaker Co., Spencerville, **$68,475.**

INDUSTRIAL, COMMERCIAL & PUBLIC BUILDINGS

Proposed Construction

Pa., Pittsburgh—B.A. 8/15—U. S. Engr., 925 New Federal Bldg., Zone 19, 1 story brick, concrete, steel 58x675 ft., general medical hospital, two 45x225 ft. wings. University Dr. $13,000,000. Altenhof & Brown, Ingham & Boyd, Mitchell & Ritchey, York and Sawyer, 230 Oliver Bldg., archts. and engrs.

Low Bidders & Contracts Awarded

Ky., Greensburg—Tennessee Gas Transmission Co., Commercial Bldg., Houston, Tex., design and construction plant for extraction and recovery of liquid hydrocarbons from natural gas, near here, to Stone & Webster Eng. Corp., 90 Broadway, New York, N. Y., **$12,000,000.**

O., Dayton—Frigidaire Div., General Motors Corp., 300 Taylor St., 600x1,600 ft. warehouse on 22 acre site, along east side of Springboro Pike and north of Eby Rd.; 250x1,840 ft. warehouse to be added to west side of present warehouse, separate contracts. **$12,000,000.**

Fla., Tampa—Hillsborough Co., July 14, court house, from Paul Smith Constr. Co., 310 N. Rome Ave. $2,388,700.

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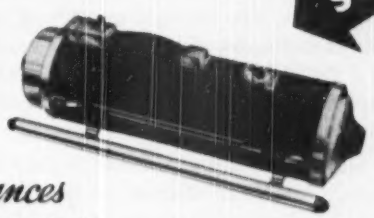
SEE

Illustrated is one of the models from the new range of Goblin Vacuum Cleaners, which surpass all previous designs for modernity and suction power. 50 years experience in designing and building fine vacuum cleaners have made GOBLIN a household word in many parts of the world.



GOBLIN *Domestic Appliances*

Also: Heat-controlled Irons, "Teamade" (Automatic Teamaker), "Lumilarm" (Bedside Companion Set), "Burolite" desk set. Synchronous clocks. Washing Machines, etc.

B.V.C Mobile TURBO-EXHAUSTER DUST-EXTRACTORS

SEE

One of a large range of Industrial Vacuum Cleaners. Models are available from ⅓ to 10 h.p. The model shown is fitted with 6 h.p. motor, large dust bucket and multiple filters. Three operators can work simultaneously with this machine.

- **Thoroughly removes dust and dirt from everywhere in factories, mills and other industrial buildings.**
- **May be used for handling and transporting dusts and powders of all kinds, including glass, chemicals, and hot soot, etc.**
- **Removes metal swarf, saw dust, flock and textile 'fly' from machinery floors and roof trusses, without the necessity for stopping production.**

MAGNETA BRITISH-MADE TIMEKEEPERS

SEE

TIME RECORDERS. Model M.16. • Fully automatic. • Automatic stamping (one hand operation). • Super Fast Recording. • Two-colour Printing. • Various card widths and lengths. • Unit construction throughout. • Mains or Master Clock Controlled.

MODEL H.508. Beautifully moulded clock of modern design equally suitable for commercial, industrial or domestic use. Walnut or Black Bakelite. Self Coloured Dial. Domed glass.

MODEL H.503 Walnut or Black Bakelite clock for Office, Institution or Works. Fitted white enamelled dial with black Roman or Arabic numerals and black hands.

B.V.C APPLIANCES INC., 11 WEST 42ND STREET, NEW YORK

Before Any Other Consideration

Integrity of Circulation

OF THE several factors that enter into the use of published media, the distribution of the advertisers' sales messages, as governed by the selection of media, can of itself decide the success or failure of the advertising investment. That is why integrity of circulation is the first consideration with experienced space buyers.

The emblem shown above stands for the FACTS that make it possible for advertisers to select the right media and to know what they get for their money when they invest in publication advertising. It is the emblem of membership in the Audit Bureau of Circulations, a cooperative and nonprofit association of 3300 advertisers, agencies and publishers.

Working together, these buyers and sellers of advertising have established standards for circulation values and a definition for paid circulation, just as there are standards of weight and measure for purchasing agents to use in selecting merchandise and equipment. In other words, A.B.C. is a bureau of standards for the advertising and publishing industry.

A.B.C. maintains a staff of specially trained auditors who make annual audits of the circulations of the publisher members. Information thus obtained is issued in A.B.C. reports for use in buying and selling space. All advertising in printed media should be bought on the basis of facts in these reports.

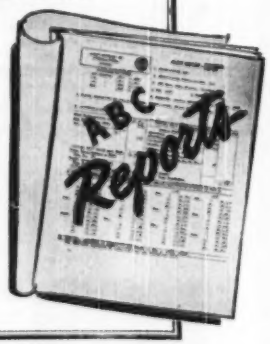
This business paper is a member of the Audit Bureau of Circulations because we want our advertisers to know what they get for their money when they advertise in these pages. Our A.B.C. report gives the facts. Ask for a copy and then study it.

SEND THE RIGHT MESSAGE TO THE RIGHT PEOPLE

Paid subscriptions and renewals, as defined by A.B.C. standards, indicate a reader audience that has responded to a publication's editorial appeal. With the interests of readers thus identified, it becomes possible to reach specialized groups effectively with specialized advertising appeals.

SOME OF THE AUDITED INFORMATION IN A.B.C. BUSINESS PAPER REPORTS

- How much paid circulation.
- How much unpaid circulation.
- Prices paid by subscribers.
- How the circulation was obtained.
- Whether or not premiums were used as circulation inducements.
- Where the circulation goes.
- A breakdown of subscribers by occupation or business.
- How many subscribers renewed.
- How many are in arrears.



McGRAW-HILL PUBLICATIONS

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SEARCHLIGHT SECTION

EMPLOYMENT • BUSINESS • OPPORTUNITIES • EQUIPMENT—USED or RESALE

POWER PLANT PERSONNEL

An east coast utility now constructing a new high-pressure pulverized fuel generating station, the first two units of which will have a capacity of 132,000 k.w., will accept applications for employment from qualified persons for the following positions. These positions will be available in the fall.

CHIEF OPERATOR

Responsible for the operation of two steam-electric generating units from a fully centralized control room. Will be required to direct other operators in the performance of their duties and operate the plant from the control room. Must have previous experience as an operator of pulverized fuel boilers, hydrogen-cooled turbine generators, high voltage switchboards, condensers, boiler feed pumps and all related auxiliaries.

ASSISTANT CHIEF OPERATOR

Will be required to assist the Chief Operator in directing the operation of, and operating from the centralized control room all equipment such as pulverized fuel boilers, hydrogen-cooled turbine-generators, switchboards, condensers, boiler feed pumps and all related auxiliaries.

INSTRUMENT MECHANICS

Previous experience on power plant instrument work essential. Must have a good working knowledge of and be able to service and repair such equipment as automatic combustion controls, flow meters, temperature recorders, gages, pH controllers and boiler meters. Must have a good understanding of electrical circuits as well as mechanical devices.

Job is centrally located near excellent residential community. Good working conditions, forty-hour week (paid vacations, insurance, sick pay and retirement plan). All personnel selected for employment will be given complete job training at full pay to familiarize them with this particular installation before assuming their regular duties.

Include complete resume of experience and qualifications in first letter, together with recent photograph. All applications will be treated confidentially. State whether present employer may be contacted.

P-7249, Electrical World
330 W. 42nd St., New York 18, N. Y.

WANTED

GRADUATE ELECTRICAL ENGINEER

For design and development of instrument transformers. Two or more years experience necessary. Waithour meter experience desirable.

If satisfactory, position is permanent with future prospects excellent.

Our staff knows of this advertisement.

P-7114, Electrical World
330 W. 42nd St., New York 18, N. Y.

PROJECT ENGINEER

Wanted — Experienced Construction Engineer for large turbo-generator power plant on East Coast. Must have recent experience in directing operations for complete project, with knowledge of sub-aqueous operations and construction of docks and waterfront facilities. Write giving full particulars of education, experience and salary expected.

P-7107, Electrical World
330 W. 42nd St., New York 18, N. Y.

REPLIES (Box No.): Address to office nearest you
NEW YORK: 330 W. 42nd St. (18)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

POSITIONS VACANT

WANTED ESTIMATOR for Electrical Contractor. State age, education, experience record, salary expected in first letter. P-7088, Electrical World.

GRADUATE ELECTRICAL engineer with at least ten years experience in distribution field work and planning. Permanent position with American utility company in South America. Preferred age not over 40 years. Good opportunity for right man. Salary commensurate with experience. P-7183, Electrical World.

EMPLOYMENT SERVICES

SALARIED POSITIONS $3,500-$35,000. If you are considering a new connection communicate with the undersigned. We offer the original personal employment service (40 years recognized standing and reputation). The procedure of highest ethical standards, is individualized to your personal requirements and develops overtures without initiative on your part. Your identity covered and present position protected. Send only name and address for details. R. W. Bixby, Inc., 262 Dun Bldg., Buffalo 2, N. Y.

SALARIED PERSONNEL $3,000-$25,000. This confidential service, established 1927, is geared to needs of high grade men who seek a change of connection under conditions assuring, if employed, full protection to present position. Send name and address only for details. Personal consultation invited. Jira Thayer Jennings, Dept. L, 241 Orange St., New Haven, Conn.

POSITIONS WANTED

ELECTRICAL ENGINEER, line foreman or superintendent of overhead distribution. Thoroughly experienced, 25 years. Age 42. PW-7215, Electrical World.

ELECTRICAL ENGINEER—B.E.E. Degree—5 years' experience plant maintenance, 4 years design of lighting and power plans for ships, 5 years teaching electrical engineering. Desires permanent position with future. PW-7256, Electrical World.

POSITIONS WANTED

DESIGNER-MECHANICAL, in early thirties, married, with family, has fourteen years experience in switchgear apparatus, covering development and design of large and small oil and air circuit breakers of outdoor and indoor type and the air, motor and spring type, gear, link, latch and combinations thereof, mechanisms for operating them. Experienced in methods, machinery, tools, jigs, fixtures for manufacturing aforementioned and structural and formed sheet enclosures of ferrous and non-ferrous materials. Interested in development and experimental design work in the mechanical line, where cost reductions, economical designs, methods of increasing production are desired. PW-7197, Electrical World.

U. S. Government

UNITED STATES DEPARTMENT OF THE INTERIOR, Bureau of Reclamation, Sealed bids (Specifications No. 3124) will be received by Bureau of Reclamation, Denver, Colorado, August 22, 1950, and then publicly opened for furnishing four 115-kv., 1,200-ampere, 5,000,000-kva, outdoor power circuit breakers; two 69-kv., 600-ampere, 1,500,000-kva, outdoor power circuit breakers; eight 115-kv., 1,200-ampere, 3-pole, manually-gang-operated, outdoor disconnecting switches; and four 69-kv., 600-ampere, 3-pole, manually-gang-operated, outdoor disconnecting switches for Tracy switchyard, Central Valley Project, California. Delivery is desired within 300 days. For particulars, address Bureau of Reclamation, Building 1-A, Denver Federal Center, Denver, Colorado.

MICHAEL W. STRAUS, Commissioner. (101)

UNITED STATES DEPARTMENT OF THE INTERIOR, Bureau of Reclamation, Sealed bids (Specifications No. 3123) will be received by Bureau of Reclamation, Denver, Colorado, August 22, 1950, and then publicly opened for furnishing six 69-kv, 1,200-ampere, 2,500,000-kva, outdoor power circuit breakers; eleven 14.4-kv, 2,000- and 4,000-ampere, 1,500,000-kva, outdoor power circuit breakers; thirty-four 15- and 69-kv, 1,200-, 3,000-, and 4,000-ampere, 3-pole disconnecting switches; six 15- and 69-kv, station-type lightning arresters; and nineteen 15- and 69-kv insulation classes, single-phase, outdoor-type instrument transformers for Phoenix substation, Davis Dam Project, Arizona-Nevada. Delivery is desired within 120 days. For particulars, address Bureau of Reclamation, Building 1-A, Denver Federal Center, Denver, Colorado.

MICHAEL W. STRAUS, Commissioner. (100)

NEW "SEARCHLIGHT" ADVERTISEMENTS
received by 10:00 A.M. Aug. 4th will appear in the Aug. 14th issue subject to space limitations.
Classified Advertising Division
ELECTRICAL WORLD
330 W. 42nd St., New York 18, N. Y.

WANTED

BUYERS OF SURPLUS COPPER INSULATED WIRES AND CABLES
No lengths too long or too short
Telephone: Eastgate 7-4778
PIERCE CABLE CO.
2670 Clybourne Ave. Chicago 14, Illinois

TRANSFORMERS

FOR SALE

1-Phase, 60 cycles

3—1800 KVA A-Ch 13800—2400
3— 500 KVA W-H 13200—240/480
3— 500 KVA G-E 11500—2300/4000Y
3— 333 KVA G-E 23000—2300/4000Y
3— 333 KVA G-E 13800—120/240
3— 333 KVA G-E 11000—2300/4000Y
3— 333 KVA Wag 4800—115/230
4— 300 KVA Kuhl 33000—2400

3-phase, 60 cycles

1—1000 KVA Wag 6900—575
3— 750 KVA W-H 13800—480 Dry Type
1— 150 KVA Penn 33000-2300
1— 150 KVA Penn 22000/11000-2300

Many other items in stock

TRANSFORMERS WANTED

Reliable rewind and repair services on all makes of transformers.

THE ELECTRIC SERVICE CO.

CINCINNATI 27, OHIO

FOR SALE

The following described Generator Unit, as is, where is. Price—$3750.00.

NORDBERG HIGH EFFICIENCY ENGINE

No. 28339
Nordberg Mfg. Co.
Milwaukee, Wisc.

Complete with jet condensor; steam pressure 170 to 220 pounds. Direct connected to

ALTERNATING CURRENT GENERATOR

No. 560153
P.F. 0.8

Type AT1 48-400-150 Form E, KW 320, Volts 2300, Amps 100, Speed 150—Mfg. General Elec. Co. This includes electric panel.

For additional information address

C. R. ODOM, CITY MANAGER,
P. O. BOX 710 BARTOW, FLORIDA

ELECTRICAL CABLE

- for every industrial and power application.
- Special constructions. Odd lengths.
- Large stocks on hand of high voltage, lead covered cables not ordinarily stocked by your regular supplier.
- Cut to length. Reasonably priced.

UNIVERSAL Wire and Cable Co.
2879 N. Clybourn Ave., Chicago 14, Ill.

MOTORS, GENERATORS, TRANSFORMERS
1 — 1500 H.P.
Bought and Sold
New and Rebuilt
ELECTRIC EQUIPMENT CO.
ROCHESTER 1, N. Y.

"Opportunity" Advertising:
Think
"SEARCHLIGHT"
First

FROM AVAILABLE STOCK

TURBO GENERATORS

KW	Make	Desc.
750	G.E.	Condensing—230 lbs. I.S.P. 440 v. 3 ph. 60 cy.—Built 1944
500	Al. Ch.	Non Cond. 150 lbs. I.S.P. 5/10 lbs. B.P. 480 v. 3 ph. 60 cy.
300	G.E.	Non-condensing 150/175 I.S.P. 5/10 B.P.—450 v. 3 ph. 60 cy.
600	Whse.	Non-condensing—125/150 lbs. I.S.P. 5/10 lbs. B.P.—240/480 v. 3 ph. 60 cy.

SYNCHRONOUS CONDENSERS

KVA	Make	Type	Volts	Speed
5140	Whse.		2400/4160	600
6000	G.E.	TSC	2400/4160	900
3000	Whse.		2400/4800	720

MOTOR GENERATOR SETS

3 ph. 60 cy.

KW	Make	Speed	DC Volts	AC Volts
1800	G.E.	900	125/250	2300/4160
1500	G.E.	300	275	2300/4600
1500	G.E.	300	600	2300/4160
1250	G.E.	600	275	4160
1000	Whse.	900	600	4160
1000	G.E.	720	250	2300/12200

TRANSFORMERS—60 Cycle

K.	Make	Type	Ph	Voltages
2000	Whse.	OISC	1	66000/11000
2000	Al. Ch.	OISC	1	13200x2300
2000	Park.	AT	3	13800x2300
1250	G.E.	HVDDJ	1	6600x550
1000	Pitts.	OISC	1	13200-2300
600	Al. Ch.	OISC	3	2300/4160x220/440
333	Pitts.	OISC	1	38400x2400

FREQUENCY CHANGERS

2000	KW	G.E.	25/60 cy. 2300/2300 v
500	KW	A. C.	25/60 cy. 11000/2300 v

BELYEA COMPANY, INC.

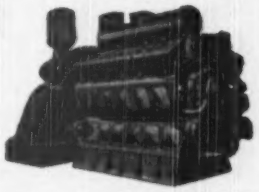
OFFICE & SHOP
51 Howell St., Jersey City 6, N. J.

DIESEL POWER

FOR

IMMEDIATE SHIPMENT

UNIT CAPACITIES—10 TO 1875 KVA
A.C.—50 AND 60 CYCLES
VARIOUS VOLTAGES



A PARTIAL LISTING OF OUR INVENTORY

KVA	Make	Model	HP	RPM	KVA	Make	Model	HP	RPM
1875	Fairbanks Morse	32F16	2000	300	375	Enterprise	DSG-6	650	450
1420	Fairbanks Morse	38D8 1/8	1000	720	330	Superior	KNA	490	514
1250	General Motors	16—278A	1600	720	312	General Motors	8—268A	450	1200
937.5	General Motors	12—567	1080	720	312	Clark	MD-4	375	327
625	Alco	6-12 1/4x13T	750	600	187	Ingersoll Rand	8	225	514
425	Baldwin	VO-6	510	450	150	General Motors	6—268A	180	1200
400 E	Buckeye	80	480	600	75	General Motors	6043C	90	1200

D.C. UNITS ALSO AVAILABLE

A. G. SCHOONMAKER COMPANY, INC.

ENGINE DIVISION, 50 CHURCH ST., NEW YORK 7, N. Y.

J. L. HEMPHILL & CO.

ELECTRICAL ENGINEERS & EQUIPMENT

SLIP RING MOTORS

1—2500 HP G.E. MT 257 RPM 6600V
1— 500 HP G.E. MT 720 RPM 2200 V 4150

SYNCHRONOUS CONDENSER

1—2500 KVA Whse 720 RPM 2200 V with D.C. Exc.

MOTOR GENERATORS

1—1000 KW G.E. 600 V 514 RPM 2200/4000 V
1— 500 KW G.E. 275 V 900 RPM 4150 Volt
2— 150 KW G.E. 125/250 V 1200 RPM 4150 Volt
1— 100 KW El. Mach. 1200 RPM 125/4150 Syn.

TRANSFORMERS

1—5000 KVA Amer. 3 Ph. 27,000V, 2300V.
2—4500 KVA G.E. 3 Ph. 27,000V, 2300V.
1—1500 KVA G.E. 3 Ph. 4150 V 2340 Pyranol
1—1010 KVA G.E. 3 Ph. 4150 V 2400 V
1—1000 G.E. 3 Ph. 4150 2 Ph. 2400 V
1— 500 KVA Kuhlman 1 Ph. 4150 V, 2300 V
2— 400 KVA G.E. 6900 2300 V Sec.
1— 100 KVA G.E. 4150-240/480 V Pyranol
2— 75 KVA G.E. 2400-240/480 V
2— 75 KVA Whse 2300-230/115

Complete Line of A.C. and D.C. Motors and Generators

FOR SALE
2 FREQUENCY CHANGERS

G.E. 1—2500 KW & 1—1000 KW both 0.8 P.F. Motors 25 cycle, 2300 volt; generators 60 cycle, 4150 Y-wye. Complete with switchboards and controls. Available at once.

The Empire District Electric Company
Joplin, Missouri—Att: Mr. O. A. Pendleton

GENERATOR SET

Used Fairbanks-Morse 5 cylinder, 175 horsepower @ 720 RPM with 125KVA Electric Machinery Generator—220-440 volt, 3 phase, 60-cycle. Skid mounted. Only 500 hours. $10,000.00.

MICHIGAN TRACTOR & MACHINERY CO.
13801 Lyndon Ave. Detroit 27, Mich.
Phone: VErmont 7-5000

FOR SALE
THREE CURRENT TRANSFORMERS

Specification #3261469 Type KF .321

25/125 cycles. primary amp 400/800 secondary amp 5 subtractive polarity

10¼ gallon Pyronal

If interested, Contact Mr. N. C. Stirewalt, V.P.

CENTRAL ILLINOIS PUBLIC SERVICE COMPANY
Illinois Building Springfield, Ill.

LETTERS TO THE EDITOR

Leave Neutral Ungrounded

To the Editor of ELECTRICAL WORLD:

In the July 17, 1950 issue of ELECTRICAL WORLD, page 162, F. W. Chapman refers to "Hazards of Star Primaries."

I believe the hazards mentioned would not be present if the neutral or star point of all step down star-delta transformer banks was left ungrounded and not connected to the primary neutral. . . .

A. J. Cyr
Co-ordinating and
Consulting Engineer
The New Brunswick Electric
Power Commission
Fredericton, N. B., Canada

(Editor's Note: ELECTRICAL WORLD's hope in publishing this comment and the letter that inspired it, is that they will lead to a critical analysis of the factors on which opposing schools base their stand.)

Engineers Are Awakening!

To the Editor of ELECTRICAL WORLD:

It is believed that the readers of ELECTRICAL WORLD noted with considerable interest your editorial of April 10th pertaining to the shortage of engineers and the challenging letter of Mr. Howard C. Zachmann contained in your issue of May 22nd.

Observation by many engineers throughout the country leads to the belief that there are many others in the engineering profession who think as Mr. Zachmann does, that it is imperative upon the current practitioners of the profession to establish a status for engineers and engineering which will not only make it attractive to the young engineer but will place it in its rightful position in the social structure of our country.

ELECTRICAL WORLD will no doubt receive a number of suggestions as to ways and means whereby the engineering profession can improve its status. Slowly the profession has begun to remedy two of its basic defects. It has been plagued for some time with the inability to distinguish the professional engineer from individuals who have endeavored to give prestige to a service or product by placing an adjective before the word "engineer." At the present time, in all states and territories, with the exception of the District of Columbia, provision for such distinction is afforded through registration laws which place in the hands of competent members of the profession the legal authority to determine those qualified to practice engineering for the protection of the health, safety, and welfare of the public at large.

A realization is also developing in the profession that it is necessary for all engineers to work together on their common problems and to devote their energies to a betterment of the professional standing of engineers, and to improve the service of the profession to the public. More than 23,000 registered professional engineers have banded together through 35 state societies in the National Society of Professional Engineers and are devoting their efforts toward this end. The NSPE is currently participating with 16 other major engineering societies in discussions on ways and means in which the engineering profession can be even more effective in raising the status of engineers and engineering and being of service to the citizens of our country.

Paul H. Robbins
Executive Director
National Society of Professional
Engineers
Washington, D. C.

(Editors Note: Also see editorial "Attaining Professional Recognition," ELECTRICAL WORLD, July 3, 1950 page 59)

Meter Obsolesence

To the Editor of ELECTRICAL WORLD:

We agree with pretty much all that was said in your editorial of July 3 on meter obsolesence. As you may remember, the writer had some considerable direct field experience on surveys to determine "what is obsolete." Based on this and contact with a number of others who have made similar surveys, I would readily agree that a simple rule of thumb kilowatthour figure is not applicable for all areas. We do believe that a kilowatthour figure can be established for any one area, based on an analysis for that area.

There is, however, one point in connection with such surveys on which I would like to comment. While a curve-drawing meter is interesting from an academic standpoint and we used them in such surveys, the final proof of the pudding is best obtained by putting the two meters in question in series. This is much simpler to do and gives you the actual results that are obtained in using one meter or the other. The curve-drawing meter, in addition, helps in the analysis of "why" such results were obtained.

All in all, we can agree thoroughly with your editorial and from our standpoint, we try to so advise all of our field contacts. There is no magic formula, but each area must be analyzed on its own.

A Meter Manufacturer

(Editor's Note: Writer of the above letter has asked that his name and company connection be withheld.)

Duct Rodding Device

To the Editor of ELECTRICAL WORLD:

We notice on page 94 of your issue of July 3rd an article entitled "Pneumatic Device Rods Duct at 200 ft Per Minute."

We are sure that most of your readers who saw this article also saw our advertisement on page 154 of the June 5th issue, showing a similar item of our manufacture, which not only accomplishes everything that the "homemade" device does but also very much more.

. . . our device . . . not only includes a reel with 1,000 ft and upwards of 7/64-in. airplane cable, but we also provide—as a very important feature —the rewinding of this cable by pneumatic power. This pneumatic rewind enables the user to pull back through the duct any cleaning tools which may be desired and also the winch cable to pull-in the conductor. . . .

Edgar W. Baird, Jr.
President

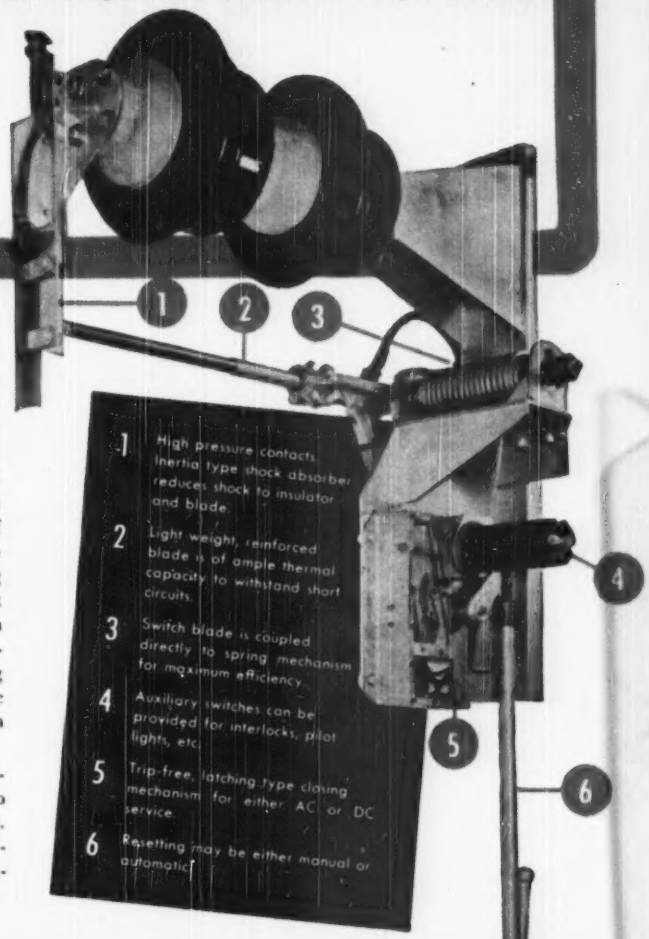
T. J. Cope, Inc
Philadelphia, Pa

INDEX TO ADVERTISERS

Page 159

TRANSFORMER FAULT PROTECTION FOR LESS!

Delta-Star "SG" high speed grounding switches offer a low cost means of transformer protection. These switches can, in many cases, replace more costly circuit breakers or pilot wire schemes.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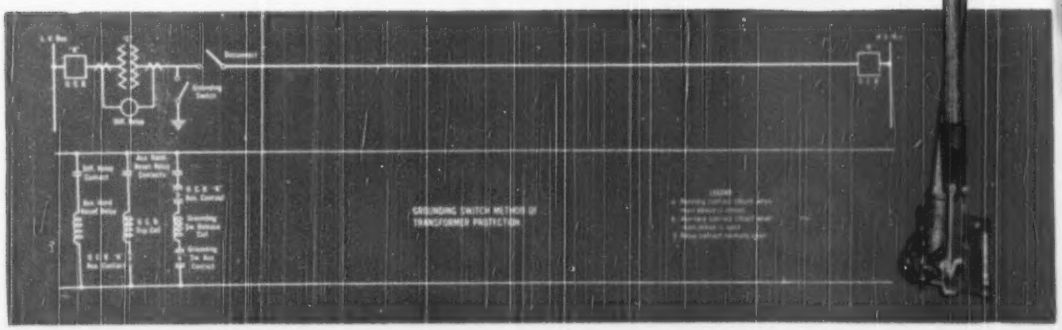
1 High pressure contacts. Inertia type shock absorber reduces shock to insulator and blade.
2 Light weight, reinforced blade is of ample thermal capacity to withstand short circuits.
3 Switch blade is coupled directly to spring mechanism for maximum efficiency.
4 Auxiliary switches can be provided for interlocks, pilot lights, etc.
5 Trip-free, latching type closing mechanism for either AC or DC service.
6 Resetting may be either manual or automatic.

THESE grounding switches are designed with high-speed automatic spring closing to deliberately short circuit a transmission line. Their principal application is in transformer protection.

In many cases system layouts are such that a circuit breaker at the far end of a line can be used for isolating a transformer bank. This method of isolation usually requires the use of an expensive pilot wire or carrier system to transmit the tripping impulse to the remote breaker. Deliberately short circuiting the line by means of a grounding switch at the transformer offers a lower cost means of tripping remote breakers. A conventional disconnecting switch can be included for manual or automatic isolation of the transformer to permit restoration of the line. See diagram below.

Delta-Star "SG" grounding switches are available as single or multi-pole units in voltages up to 161-Kv. with closing speeds of 30 cycles or less. They can be mounted independently or on standard disconnecting switches. Resetting can be manual or automatic.



DELTA-STAR ELECTRIC COMPANY

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NEW YORK OFFICE — 100 Cedar St., New York 6, N. Y.

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CANADIAN ASSOCIATE
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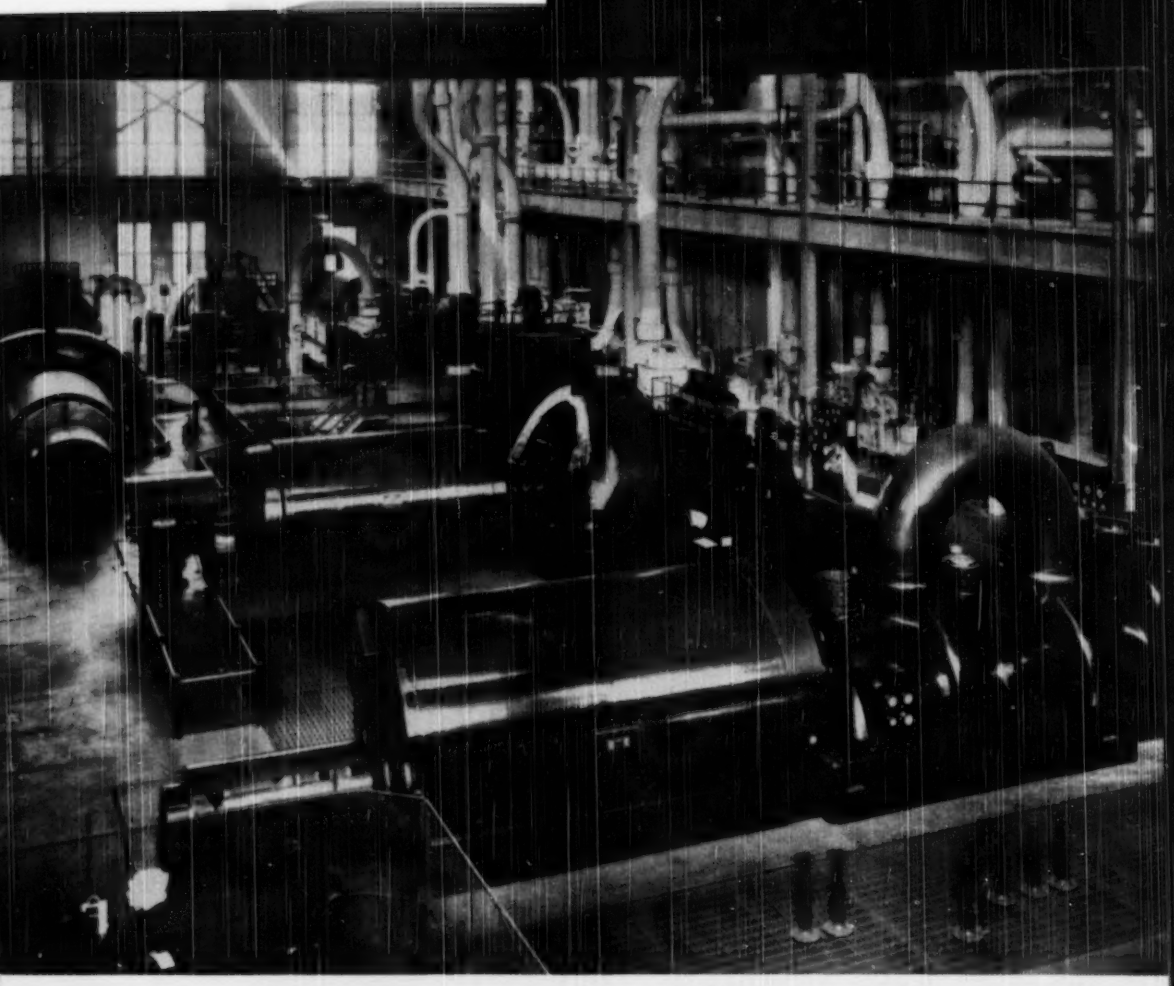

Turbines in the Kansas City Power and Light Company's Second and Grand station: a 10,000-kw., a 11,500-kw., a 20,000-kw., and two 35,000-kw. units, all lubricated with NONPAREIL Turbine Oil.

Turbines stay on the job, so does ➡ ➡ ➡

USED first in a 20,000-kw. turbine in 1936, NONPAREIL Turbine Oil today lubricates five turbines, totaling 111,500 kw., in the Kansas City Power and Light Company's Second and Grand station. Reason for this acceptance is easy to find in the oil's low acidity records.

In the oldest fill (14 years), the neutralization number has not exceeded 0.10 mg. KOH/gm., and in all five fills it has averaged only 0.07 mg. KOH/gm. The consistently low acidity of NONPAREIL has kept turbines on the job and minimized maintenance time.

Gain these advantages by using NONPAREIL in your turbines: no oil replacements, no removal of oil for treatment, no cleaning of oil systems and governors. For evidence of these advantages, ask a Standard Oil lubrication specialist to supply you performance data from the 20-year service record of NONPAREIL Turbine Oil.

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Turbine Oil

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Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.

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